



PRACTICAL HELPS

FOR FARM AND HOME

PRACTICAL HELPS FOR FARM AND HOME

A Collection of
Practical Ideas, Use-
ful Information and
Frequently - Used
Reference Data for
Use on the Farm and
in the Home



Compiled and Published by

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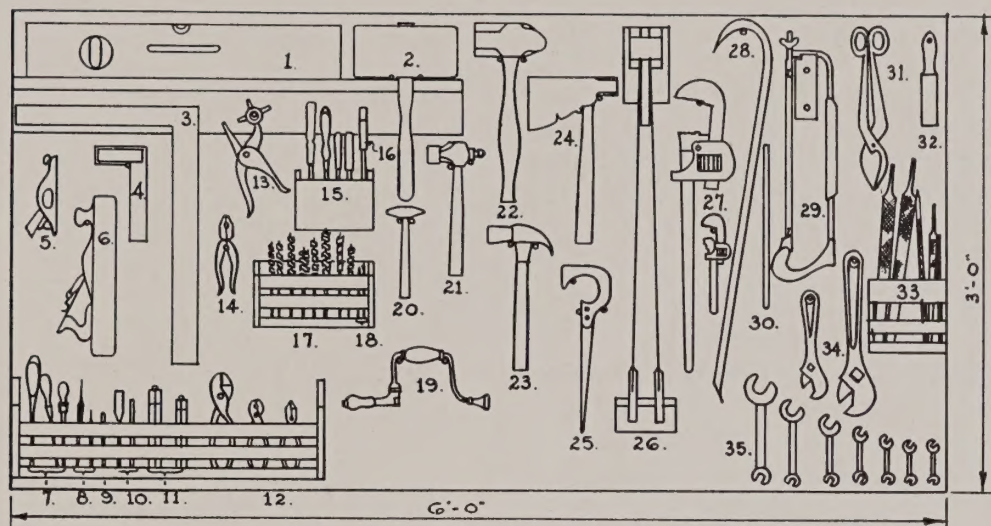
Table of Contents

For your convenience in using it, the material included in this book has been arranged in sections. The table below lists these sections and the various items which make up each section.

	PAGE		PAGE
FARM MECHANICS SECTION	3-4-5-6-7-8-9-10-11-12	Cleaning and Polishing Metals	38
Tool Panel Saves Time	3	Removing Grease Spots	38
Care of Idle Machinery	3	Dutch Oven Trouble	39
Make Own Penetrating Oil	3	Removing Lime From Teakettle	39
Refitting Axe Handles	4	Prevents Cut Fingers	39
Hint for Filing Saw	4	Stops Corroding of Shaker Tops	39
Protecting Padlocks	4	Refrigerator Tips	39
Keeping Hammer from Falling	4	Save the Saucepan	39
To Remove Road Tar Spots	4	Dry Clean Lard Buckets	39
Shoulder Aid for Carrying	5	Added Paper Use	39
Water Flash Light	5	Flame Color—Key to Efficiency	40
To Divide Board into Equal Parts	5	Funnel Separates Eggs	40
New Use for Fly Sprayer	5	Salt Conditioners	40
Right Way to Pour Oil	5	Clothesline Tightener	40
Keep Tools from Underfoot	6	Keep Cake Fresh	40
Ice Cleans Grindstone	6	Tomato Care	40
Avoid Ladder Slipping	6	Storing Lemons	40
Thawing Frozen Pipes	6	Jumble of Wisdom	41
Storage Cabinet from Cans	6	Separate Lettuce	41
How to Remove Broken Screw	7	Lamb Secret	41
Knuckle Guards	7	Meat Stretcher	41
Stop Split Binder Tongues	7	Table Stretcher	41
Protect Teeth of Handsaws	7	Piano Scratches	41
Using a Hacksaw Properly	7	Good Duster	41
Overhauling the Mower	8	Moisture Helps Corn Pop	42
Avoid Common Pump Troubles	8	For Wicker Furniture	42
Starting Tractor After Long Idleness	8	Removing Match Scratches	42
Safe Saw Horse	9	Gum Remover	42
Driving Tacks in Tight Places	9	To Kill Dandelions	42
Hoist for Milk House	9	Moth Killer	42
Scaffold Hitch and Bowline Knot	9	Painting Hints	42
Tool Box for Quick Repairs	10	Longer Life From Linens	43
Causes of Common Mower Troubles	10	Skirt Marker	43
Handy Farm Anvil	10	Shoe Brush	43
Open Top Saw Horse	10	Restore Color to Fabrics	43
Calibrate Planter Before Using	11	Victory Garden Planting Guide	44
Dependable Rope Knots	11	POULTRY SECTION	45-46-47-48
Replacing Broken Wheel Spokes	12	Poultry Classifications	45
Protecting Paint Brushes	12	Identifying Stock for New Hands	45
Keep a Job List Posted	12	Egg Profit Calculator	46
Rope and Block Sizes	12	Suggestions for Marketing Eggs	46
FENCING SECTION	13-14-15-16-17-18-19-20-21-22-23-24	Brooding Precautions	46
Republic Wire Gauge	13	Take Care of Egg Cases	47
To Mend and Restretch Broken W	13	Roost-Proof Waterer	47
Hinged Stock Gap Cover	13	Incubation Periods	47
Splicing Smooth Wire	13	Control Measures for Coccidiosis	48
Fence Stiles	14	Selecting Best Layers	48
Easily Constructed Post Puller	14	FARM BUILDING SECTION	49-50-51-52-53-54
Staples Drive Easier	14	Know Your Nails	49
Good Staple Puller	14	Light Reflection Values	49
Fastening a Temporary Fence	14	Maintenance of Steel Roofing	50
Walk Through Gate	15	To Figure Roof Pitch	50
Dragless Walk Gate	15	Magnetic Rake for Nails	51
Double Purpose Gate	15	Keep Silos Repaired	51
Handy Hog Pen Gate	15	Laying Out Building Foundations	52
Gate Holder	15	Allowance for Laps on Corrugated Sheets	53
Barbed Wire Handler	16	Recommended Concrete Mixtures	54
Splicing Barbed Wire	16	Farm Water Requirements	54
Reel for Old Barbed Wire	16	REFERENCE SECTION	55-56-57-58-59-60-61-62
Barbed Wire Stringer	16	Weights and Measures	55
Circus Type Post Puller	17	Rates of Travel	55
Post Tampers	17	Horsepower Equivalent	55
Marker Saves Fence Building Time	17	Properties of a Circle	55
Temporary Fence Saves Time	17	Estimating Wall Paper Requirements	55
Fencing on the Contour	18	Six Percent Interest Table	56
Completed Contour Fence	19	Compound Interest	56
Cotton Field Planted on Contour	20	Weight of Water	56
Gully Control and Reclamation	21	Easter Sunday	56
V-Type Check Dam	22	One Month to Same Day in Another	56
Suspended Net Type Dam	22	Estimating Materials for Concrete	57
Stock Guards	23	Board Feet	57
Double Span End and Corner Post Assemblies	24	To Compute Board Feet	58
LIVESTOCK SECTION	25-26-27-28-29-30	To Change Board Feet to Lineal	58
Holder for Vaccinating Pigs	25	Weights of Structural Materials	58
Handy Crate for Moving Hogs	25	Common Measuring Units per Cubic Foot	58
Suggested Rations for Swine	26	Common Measures and Weights	58
Cleaner for Hog Troughs	26	Estimating Bricks for Chimneys	58
Definitions of Feeding Terms	27	Determining Coal Bin Capacity	58
Estimating Weights of Heifers	28	Capacity of Corn Crib	59
Gestation Table	28	Calculating Chart—Field Coverage	59
Safety Door for Bulls	29	Capacity of Circular Metal Crib	59
Suggested Rations for Beef Cattle	29	To Estimate Grain—Hay Quantities	59
Use for Old Milk Cans	30	To Determine Capacity of Field Machines	59
SAFETY SECTION	31-32	Capacity of Silos	60
Artificial Respiration	31	Tank Capacity in Gallons	60
Check List for Fire Hazards	31	Daily Feeding From Silo	60
Applying Pressure to Stop Bleeding	31	Contents of Field and Lots	60
Safety of the Small Child	31	Globular Measure	60
Safety in the Kitchen	31	U. S. Government Land Measure	60
Ladder Precautions	32	Capacity of Cylindrical Tanks	61
In Case of Fire	32	Capacity of Cisterns in Barrels	61
To Avoid Injury When Lifting	32	Relation of Diameter to Capacity of Pipe	61
Home Fire Precautions	32	Daily Capacity of Farm Machines	61
Home Remedy	32	Acreage per Mile of Various Widths	61
HOMEMAKERS' SECTION	33-34-35-36-37-38-39-40-41-42-43-44	Miles Traveled in Plowing an Acre	62
Kitchens for Farm Homes	33	To Determine Water Pressure	62
Weights and Measures	37	Truck Tire Capacities	62
Short Cuts for Busy Homemakers	37	Weights of Farm Products	62
Removing Stains	38	Dried Fruit and Vegetable Yields	62

FARM MECHANICS SECTION

Tool Panel Saves Time—Encourages Better Care



One method of encouraging the return of tools to their proper places is to have a definite place for them. A tool panel, such as the one illustrated here, is suggested by Purdue University. A red picture of the tool, painted in the proper place on the panel, tells exactly what tools may be missing and also serves as a guide when replacing them. A key to the numbers of the tools shown on the panel follows:

1. Level
2. Mallet
3. Steel square
4. Tri-square
5. Block plane
6. Jack plane
7. Screw drivers
8. Drift punches
9. Center punches
10. Cold chisels
11. Rules
12. Pliers
13. Leather punch
14. Electrician pliers
15. Wood chisels
16. Automatic drill
17. Auger bits
18. Nail
19. Brace
20. Tack hammer
21. Machete hammer
22. Five-pound hammer
23. Claw hammer
24. Hatchet
25. Compass saw
26. Saws
27. Pipe wrenches

28. Wrecking bar
29. Hack saw
30. Blades (Hack saw)
31. Tin snips
32. File cleaner
33. Files
34. Crescent wrenches
35. End wrenches

Other desirable tools for the farm workshop (not illustrated here) would include the following:

- Bench screw or "C" clamp
- Compass (dividers)
- Drawing knife
- Grindstone
- Oil can
- Scratch awl
- Tape line—50 feet steel or cloth
- Vise—4-inch jaw or larger
- Whetstone
- Wire splicer
- Wrench (monkey) 8-inch
- Wrench (monkey) 15-inch
- Drill press (blacksmith's post)
- Drills—a set of 12 varying from $\frac{1}{8}$ in. to $\frac{13}{16}$ in.
- Forge
- Hoisting block ($\frac{1}{2}$ -inch rope)
- Jackscrew (10-ton capacity)
- Tongs
- Set of taps and dies for bolts (machine thread)
- Blow torch
- Soldering irons (pair)
- Socket wrenches
- Anvil, 100 lbs. (Steel-face cast anvil)

(Reprinted from Purdue University Extension Bulletin 289)

Care of Idle Machinery

The watchword of the farmer in regard to his machinery should be "Good machinery, properly oiled, repaired, adjusted, and well housed."

When a machine is left standing for a short period, the working parts that are likely to be damaged by rust should be greased or covered. At the end of the season, whether a machine is to be housed or not, it should be thoroughly cleaned and all the bearings and bright surfaces oiled or greased.

Before putting a machine away, go over it carefully for broken or badly worn parts, tag them, and order the new parts at once.

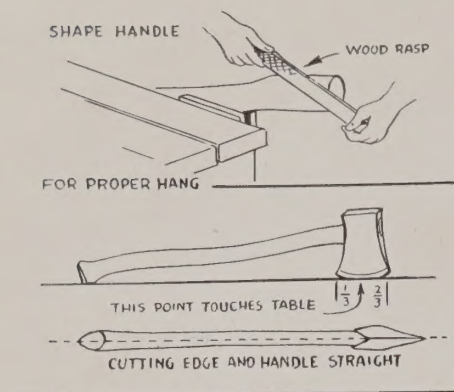
Machinery to be properly housed must be placed on a floor or on boards in a closed, dry shed to which stock does not have access. Unfortunately, housing often means merely putting machinery in an open, leaky shed with a dirt floor, where it serves as a chicken roost. It would be just as well off standing out in the open. Some machinery, however, can be stored outside if properly cared for. Corn cultivators, disks, drag harrows, and even plows can be left outside if the polished parts that can be taken off are removed and put in a dry place, the other polished parts greased, and the rest of the machine given a coat of paint when it is needed.

Investigations from several states indicate that the life of farm machinery is practically doubled by proper housing. Attention to this point alone would mean a tremendous saving to farmers and, in addition, would increase the ease with which a machine is adjusted and the quality of work it does. (From "Farm Machinery, Its Purchase, Care, Operation and Adjustment," University of Illinois.)

Make Own Penetrating Oil

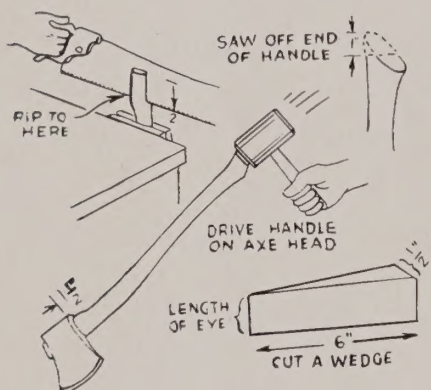
Agricultural engineers at Iowa State College say a good penetrating oil can be made in the farm shop by mixing 1 part new engine oil (S.A.E.20) with 10 parts water-white kerosene. One part of unsalted rancid lard may also be added if available. The engineers recommend that penetrating oil be applied to the machinery parts 24 to 48 hours before they are to be taken apart. This allows time for the oil to soak in and loosen the joint before pressure is applied.

Refitting Axe Handles



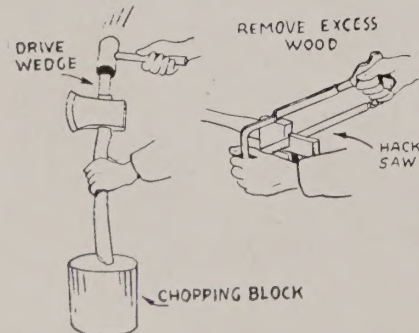
Handle should fit axe eye snugly at all points. Tap in handle to test it for hang.

A new axe handle, as purchased in the store, was not made to fit an axe head. It was made to possibly fit a number of heads, and thus needs to be shaped. A wood rasp is probably the best tool to do the job.



Cut off one inch of grip end of handle so it won't split when driven in head.

The handle should fit the axe eye snugly at all points. Never drive a nail in the end of the handle after it has been fitted to the head to hold the head on. It will split the wood, and allow the head to slip off. Use a wooden wedge as shown.



Wedge should be dry soft wood. Drive it squarely. Soak handle with hot linseed oil.

The wedge should be dry soft wood. After driving it squarely into the handle soak the handle in hot linseed oil for a short time.

Prevent Rope Ends Fraying

When you knot the end of a rope to prevent it from fraying, dip it into glue and allow it to dry before using. This will keep the knot from loosening. If the rope is to be used where it is likely to get wet use a good grade of water-proof glue.

Hint For Filing Saw

When filing any kind of a saw, smoke the teeth first by passing them through the flame of a candle. This will make it easy to see the fresh file cut and to hold the file at the right angle for the job.

Protecting Padlocks

Rain and snow falling on padlocks used on the outside of buildings cause rusting and freezing, making them difficult to open. This trouble can be eliminated by cutting a piece from an old inner tube and tacking it on the side of the building so that it will hang down over the lock.

Keeping Hammer From Falling

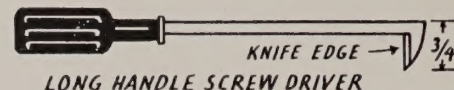
When you are working on a ladder or scaffold, or on a well curbing, dropping of the hammer not only causes inconvenience but also might endanger other persons or livestock. To avert this, drill a small hole near the end of the hammer, insert a thin strip of rawhide and make a loop in the rawhide large enough to go over the wrist. This loop can also be used for hanging the hammer up when it is not in use.

Adjustment and Repair of Mowing Machines

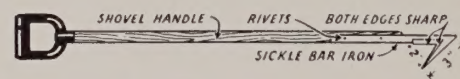
Under average conditions probably no other farm machine will yield as large a return for proper care, adjustment and repair as the mower. The life usually will be increased, the draft materially reduced and the quality of work considerably improved by good care. Adjustments and repairs are easily made, and the cost is relatively small. This article covers the common adjustments and repairs, and the methods as explained will require a minimum of time, labor and equipment.

The cutter bar assembly, including the knife, guards, guard plates, wearing plates and knife clips, is the heart of the mower. The cutting action may be compared to an ordinary shears of which the knife sections are one blade and the guard plates the other, with the wearing plates and the knife clips holding the two parts together so that a shear cut results. The cutting troubles are usually located in the cutter bar assembly.

A Tool to Clean Spreader Beater

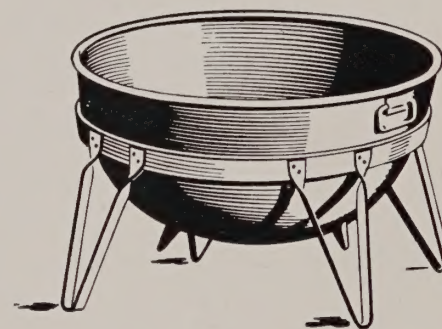


If you've had the mean and tedious job of cleaning the straw, hay and binder twine from the beater of a manure spreader here is a hand tool that will do it in a jiffy. It will end skinned hands and broken knife blades. Your blacksmith can make it for you out of an old long-handled screw driver. A hook is formed at the end of the screw driver and the inside of the hook is sharpened to a knife edge. With this tool you can hook in around the beater, cutting and pulling out clogging material.



A similar tool on a larger scale can be made for removing large weeds from the hills of corn. Use an old shovel handle and rivet a sickle bar iron onto the end of the handle. In this case both inside edges of the hook are sharpened.

A Simple Cauldron Stand



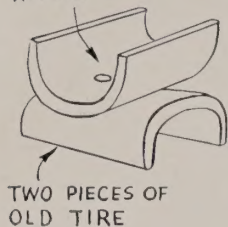
To make a simple and sturdy stand for the cauldron kettle, get an old tire rim equal in inside diameter to the outside diameter of the cauldron about half way up the outside. Bolt, rivet or weld legs made of 1/4" x 1 1/4" strap iron in position as shown.

To Remove Road Tar Spots

Linseed oil will remove road tar without damaging the finish of your automobile. Saturate the spots of tar with the linseed oil. Let linseed oil stand for a few minutes to allow it to penetrate the tar. Heavier spots require more time. Then remove each spot with cheese cloth. The linseed oil softens the tar so that it can be easily rubbed off.

Shoulder Aid

CLOTH COVERS
RIVETS



TWO PIECES OF
OLD TIRE



Aid for sore shoulders is a pad made from two sections of an old tire and used for carrying pipes and logs. The two sections are riveted together and the rivets covered with a cloth pad.

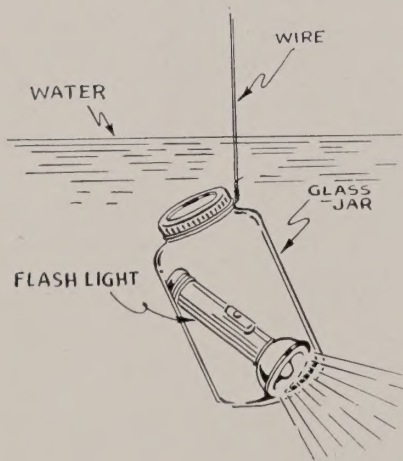
Grain Drill Seed Supply Made Visible

By sawing a small hole in the grain drill seed box and covering it with a piece of clear glass, you can see from your tractor seat whether or not the seed supply is exhausted. This saves frequent stops necessary to see that there is a supply of grain seed in the box.

Grease Boots with Bacon Rind

Leather boots and work shoes can be kept soft and pliable as well as reasonably waterproof by frequently rubbing them with the inside of bacon rind. Do not use this if boots are ever to be polished as they will not polish after such a treatment.

Water Flash Light



The diagram shows how to use a flash light to locate articles in deep water. Drop a flash light into a fruit jar with the light turned on, screw the lid down tightly and lower the jar into the water. The article can then be easily seen.

Usually it will be necessary to put a piece of lead or other weight in with the flash light before the empty jar will sink.

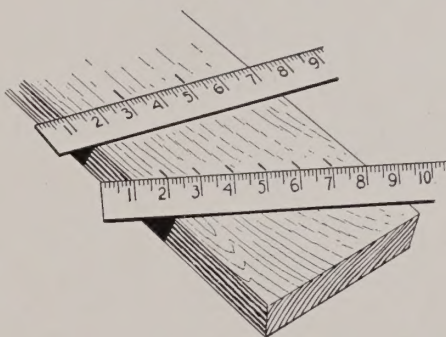
Toe Pull Opens Screen Door

Did you ever have to yell for help when you had your arms full and a screen door blocked your path? A toe pull attached to the bottom of the screen door is a great convenience in such circumstances. This may be a simple little block of wood securely nailed to the outside of the screen door and under which the toe of the shoe may be hooked.

Oil Spreader Box

Two coats of used crankcase oil at the beginning of the season will effectively prevent manure from sticking and caking to the spreader box. Coat the oil on with an old paint brush, just like paint. After the first coat is well soaked in, apply a second coat.

To Divide a Board of Any Width Into Equal Parts

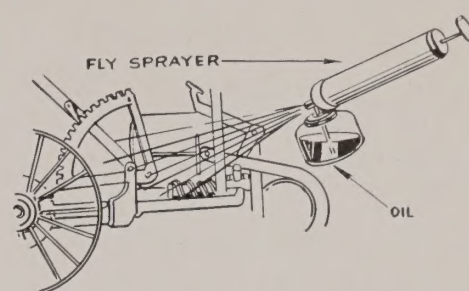


It's easy enough to divide a four inch board into four equal parts for ripping if you have no other measuring device than a foot rule. If you want to divide the same board into three or five or seven equal strips, it's a little more difficult unless you know the trick. Of course, it is possible to figure out the width of the strips mathematically, but there's a simpler way that works regardless of the width of the board or the number of strips to be cut. Simply lay the rule across the board at an angle so that the number of inches measured is equal to the number of parts into which the board is to be divided. The inch marks then automatically divide the width of the board into the desired number of equal parts. (In case the number of pieces into which the board is to be divided is less than the number of inches in its width, use multiples of 1½" or 2" instead of 1").

Pump Cleans Seed Drill

A tire pump can be useful in cleaning the seed drill of dirt and seed. This is safer than any other method because the compressed air from the pump cannot damage the drill.

New Use for Fly Sprayer



To make sure a coating of oil reaches all the corners, as well as to speed up the job of applying crankcase oil to disks, plowshares, and mower sections, try using an ordinary fly sprayer for the application job. Warm the oil slightly for best spraying results.

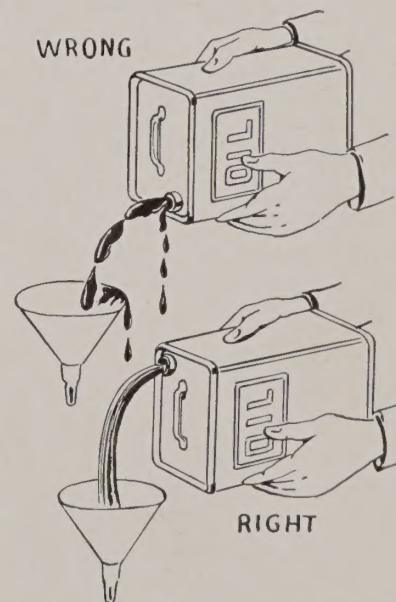
Making Tools Easy to Find

We have all had experience with lost tools when working in the fields or around the house or barn. You can save a lot of time and temper—as well as tools—by painting the handles of wrenches, hammers, saws, shovels, hoes, etc. a bright yellow or orange. These colors are easily seen, even from great distances, and tools will be found easily, even when left lying in grass or weeds.

Be sure to use a good quality of paint or enamel that will dry hard.

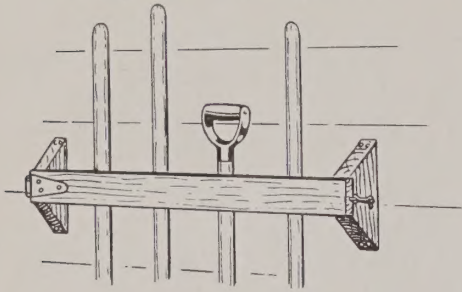
This plan also makes it easier to identify your own tools and reduces losses through loans of tools to others.

Right Way to Pour Oil



Ever have trouble pouring oil from a can which has no air vent? Did it come in a slim trickle one minute, then gush far over the top of the funnel the next? Simply hold the can with the hole at the top, thus making the upper half of the outlet hole serve as air intake. Works like a charm.

Keep Tools from Underfoot



If shovels, spading forks, pitchforks and similar tools are stored where they may be knocked down and trampled on by livestock this simple rack may be all that is needed to remedy the trouble. Attach two short 2"x4" blocks to the wall where tools are customarily kept and at a height below the tops of handles. Hinge a 1"x4" board to one block and fasten the other end with a hook. It is not advisable to set the mounting blocks more than two feet apart. If more storage space is required increase the number of racks. This rack merely holds the handles against the wall so that the tools will not fall over and get tangled underfoot. A piece of 1"x2" may be nailed to the floor several inches out from the wall to keep the lower ends of the tools from sliding out.

To Find Length of Belt Required

When it is not convenient to measure the length required with the tape-line, apply the following rule: Add the diameter of the two pulleys together, divide the result by 2, and multiply the quotient by $3\frac{1}{4}$; then add this product to twice the distance between the centers of the shafts, and you have the length required.

If possible to avoid it, connected shafts should never be placed one directly over the other, as in such cases, the belt must be kept very tight to do the work.

It is desirable that the angle of the belt with the floor should not exceed 45 degrees. It is also desirable to locate the shafting and machinery so that belts should run off from each shaft in opposite directions, as this arrangement will relieve the bearings from the friction that would result when the belts all pull one way on the shaft.

To Find Belt Speed in Feet per Minute

Multiply diameter of pulley in inches by 3.1416. This gives circumference of pulley, and this result multiplied by number of revolutions will give you belt speed in inches.

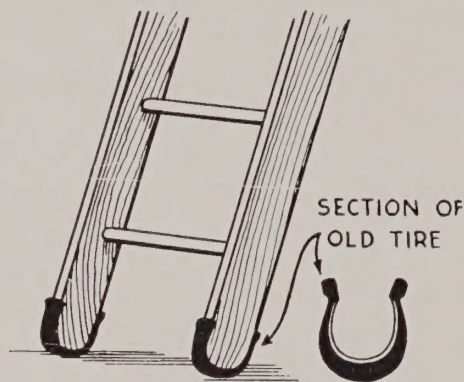
Ice Cleans Grindstone

If your grindstone becomes badly coated with dirt and steel, hold a piece of ice against it while it is turned slowly. Remarkable as it seems, this will remove the accumulation very quickly.

To Catch Chips When Boring Overhead

A conical dirt catcher will keep chips, dirt and dust out of your face when you are boring holes in the ceiling. It is made of stiff cardboard and is provided with a wire guide at the wide end to hold the cone in position and is fastened with a rubber band around the shank of the bit. It, of course, revolves with the bit while boring. When you are working in the house, this device also keeps the litter off the floor.

Avoid Ladder Slipping



When using a ladder on hard or slippery surfaces, some method of holding the ladder should be provided to prevent accidents. Sections of old tire casings, attached to the foot of the ladder as illustrated, will prevent it from sliding. These rubber pads, a little wider than the sidebars of the ladder, may be either nailed or screwed in position.

Avoid Fouled Spark Plugs

Spark plugs often foul because the improper type is used. They are manufactured in a number of different heat ranges. A cold spark plug designed for use in a high compression gasoline-burning engine will foul readily in a low compression distillate-burning engine. Distillate-burning engines require a hotter spark plug or one with a longer porcelain around the insulated point. Gasoline engines require a cooler spark plug or one with a shorter porcelain. A plug that is firing properly and is of the correct heat range will have a chocolate color around the points and porcelain. A plug that is too "cold" will be moist with unburned fuel around the points. A plug that is too "hot" will have a black scorched scale around the points and porcelain.

Thawing Frozen Pipes

The middle of a frozen pipe should never be thawed first because expansion of the water confined by ice on both sides may burst the pipe.

When thawing a water pipe, work toward the supply, opening a faucet to show when the flow starts. When thawing a waste or sewer pipe, work upward from the lower end to permit the water to drain away.

Loosen Nuts by Heating

When repairing farm machinery, difficulty is often encountered in removing rusted nuts from bolts. Heating often loosens a rusted nut so that it can be removed easily.

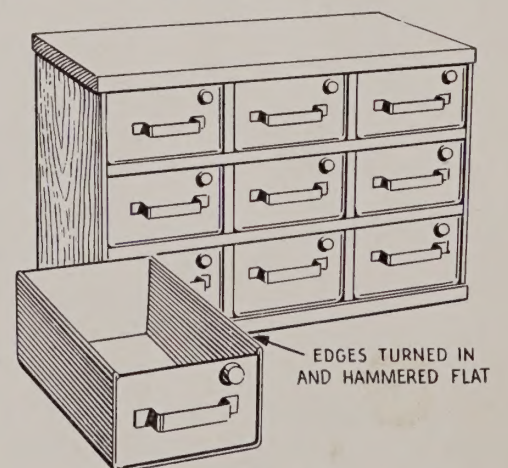
Rock Cracking Made Easy

Cracking rocks with a stone hammer may be all right if you need the exercise but there is an easier method. When you want small stones to use in foundation construction, apply a blow torch to large rocks, heat them up, and then give them a rap or two with a hammer. Stones of just the right size are the result.

Oiled Chain Gathers Dust

Exposed chains on farm machines which must operate in heavy dust are better not oiled at all, as the combination of oil and dirt forms a grinding compound which soon wears down metal. If a farmer feels that he must use a lubricant, a light dusting of powdered graphite on the chains is recommended.

Storage Cabinet from Cans



If you have a number of empty gallon oil cans, it's easy to make a handy cabinet for storing screws, bolts, nails, etc. Simply cut out one side of each can. Turn the cut edges in and hammer them flat to avoid injury. Make a wood case to accommodate the number of cans you wish to use, providing dividers as shown in the illustration.

To Tighten Loose Wood Screws

Remove the loose screw and drive into the hole a wooden peg that fits firmly and yet not so tightly as to split the wood. Then replace the screw and it will hold. If the screw must withstand some stress, a bit of glue on the peg will hold it even more firmly.

Here's another way to tighten loose screws. Remove the loose screw, pack the hole with steel wool, then screw it back into place. It will be as tight as new.

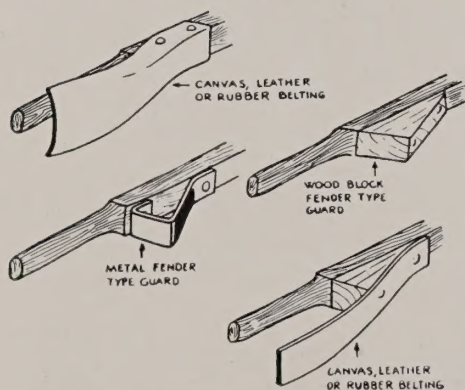
To Release Tight Screws

Here is a simple but ingenious way to loosen a tight screw. Press a red hot poker against the head. This heats the screw which will expand and of course its hole will be enlarged too. When the screw cools it will contract but the hole will not. The screw is then loose enough to remove without undue effort.

How to Remove Broken Screw

If you unfortunately break off a screw in hard wood, don't despair. You can remove it neatly by drilling a small hole alongside of the broken section and in line with the grain of the wood. With a nail punch then carefully drive the screw into the drilled hole. You'll have little trouble lifting out the broken section after you have moved it over into the drilled hole. Plug the drilled hole with a peg of hard wood and you are ready to start all over with a new screw in the old hole.

Knuckle Guards



For Trucks and Wheelbarrows

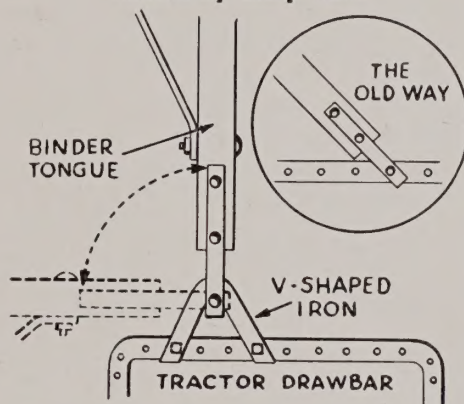
Many hands have been broken, fingers smashed and knuckles skinned as a result of striking the hands against door jambs, columns, piles of materials and other objects, while handling trucks and wheelbarrows. Knuckle guards that give fairly good protection are easily made. The accompanying illustration shows how.

National Safety Council Safety Instruction Card No. 248.

Making Tractor Hook-Up Easy

Here is how one farmer has made a simple job out of a task that formerly required two or three men and much effort. Using short pieces of 2"x6" or 2"x8" lumber spiked together, he has made blocks which hold the tongue of his heavy mower and other two wheeled implements up to the height of the tractor draw bar. He has made such a block for each implement and finds a place somewhere on the implement to carry it. When he is through using the implement or must unhook the tractor for another job, he places the block under the tongue and uncouples it. When he wants to use the implement again, he merely backs the tractor in, makes the connection, removes the block and goes to work.

Hook-Up to Stop Split Binder Tongues Caused by Sharp Turns



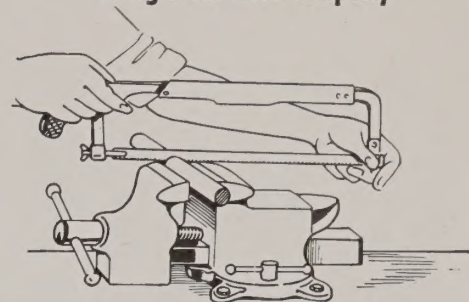
Sharp right angle turns may split the binder tongue on some tractor hook-ups. Note in the part of diagram labeled "old way" how tongue of binder may be split or broken by pinching against tractor draw bar if the angle of turn is too acute, such as a square turn made at corners.

The main diagram shows a simple "V"-shaped attachment to the draw bar that permits a sharp right-angled turn and a neater job of cutting the field without danger of smashing the binder tongue. The attachment is made of iron a little lighter than that used in the drawbar, drilled for bolting to drawbar and attaching to binder tongue.

Protect Teeth of Handsaws

If you carry handsaws about the farm along with other tools, you probably have had trouble from damage to the teeth of the saw. An old piece of garden hose can remedy the trouble. The hose is cut the length of the saw and slit along one side. This fits smoothly over the saw teeth and gives needed protection.

Using a Hacksaw Properly



When using a hacksaw make sure that the material to be cut is held rigid and so placed that the maximum number of teeth engage through the cut. When cutting very thin stock, a good method is to clamp it between two pieces of wood and saw through the whole assembly.

Begin the cut carefully, but use sufficient pressure to make the teeth cut and not merely rub on the metal. On the return stroke lift the saw slightly to avoid dragging the teeth and thus dulling the cutting edge. The top speed for efficiency is about 40 to 50 strokes per minute. For faster cutting, increase the pressure, not the speed.

When a new blade is used it is a good practice to retighten the blade after the first few strokes.

Some of the most common causes of blade breakage can be easily avoided. Always use straight-line strokes to avoid cramping and binding. Fasten the piece to be sawed securely, for if the work becomes loose while cutting the sudden binding and distortion of the blade is practically sure to cause breakage.

Hacksaw blades having 18 teeth to the inch are best for general service; while for pipe or conduit, light angles, and ornamental iron, a blade having 24 teeth is preferable. Use a blade with 32 teeth to the inch for thin sheet metal and light tubing.

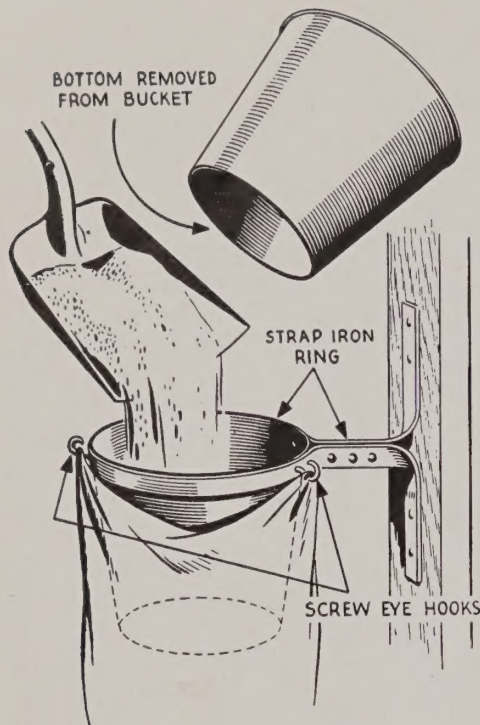
Wax Auto Door Latches

Auto door latches should never be oiled. The oil catches dirt and will soil clothing. Either paraffin wax, hard stick grease or graphite should be rubbed over the latch and strike plate. Latches will work smoothly and easily after this treatment. The same treatment may be applied to any door latch that is not operating as smoothly as it should.

Paint Tug Links to Save Time

To equalize tugs with chain traces it is, of course, necessary to count the links. This is a nuisance. By painting a certain link on each length of chain the count can be made from the link so marked, which saves much time.

Sack Filler Funnel



A large pail with the bail and bottom removed makes an ideal funnel for use when filling sacks with grain or potatoes. The pail is held in the mouth of the sack by a helper and makes a rigid opening through which the material can be scooped.

If you want to eliminate the need for a helper, you can fasten the pail to a post by means of a ring of heavy strap iron which is also provided with hooks for holding the bag. If the post is provided with a suitable base to prevent tipping, the device can be moved around and used wherever needed.

Magneto-Type Pump Engine Shut-Off

If you use a magneto-type gasoline engine to pump water, you can rig it so that the engine will shut off when the water has reached a predetermined level. Using almost any kind of insulated electric wire, splice one end into the magneto wire and scrape the insulation on the other end, too. Then arrange the bare loose end of the wire in the tank so that it comes down to the level you want the water to reach. Be sure it does not touch the side of the tank. When the water rises and touches the bare tip of the wire, it grounds out the magneto and stops the engine.

Horseshoes for Hooks

Horseshoes make husky hooks around the barns and sheds. They can be fastened overhead to the joists or to the sides of wall studding with either nails or screws.

Overhauling the Mower

When overhauling a mower the following points should be considered:

1. Block up tongue to correct operating height.
2. Is cutter bar in alignment?
3. Are any guard plates nicked, dull, loose or broken?
4. Are guard plates in alignment?
5. Have guard lips been bent down?
6. Are wearing plates worn or improperly adjusted?
7. Are knife clips properly adjusted?
8. Are knife heads and guides worn or improperly adjusted?
9. Does knife register in the guards?
10. Are any sections loose, dull, nicked or broken?
11. Are sections properly sharpened?
12. Do any bushings need replacement?
13. Do gears mesh properly?
14. Is the clutch in proper adjustment?
15. Are thrust bearings properly adjusted?
16. Are drive wheel ratchet, dogs or pawls badly worn?
17. Are lifting parts worn or out of adjustment?

From "The Adjustment and Repair of Mowers"—Iowa Extension Circular 192 Rev.)

Avoid Common Pump Troubles

If the pump for your well loses its priming (the water runs down) perhaps the check valve may be defective or some obstruction may be under this valve. This obstruction may be sand or gravel, or a little cutting broken from the pipe thread. Remove the valve and scrape the lower side with a knife. Be sure to remove all grit.

When the pump discharges air bubbles with the water, the suction pipe is not screwed together tightly, or it may be split open.

If a double acting pump throws water only on the down stroke of the handle, something may be lodged under the lower check valve, or the plunger leather may be worn out.

If the pump throws water only on the upward stroke of the handle, something may be lodged under the valve in the lower bucket, or it may have become hardened and curled up.

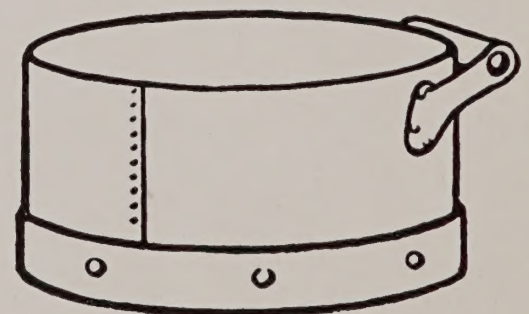
When you pull the pump handle down, if it jerks back, one of these things may be the cause: The cylinder may be too far from the water or the supply is shut off in some manner; the suction pipe may be too small; or if it is a drive well, the screen may be clogged.

Starting Tractor After Long Idleness

If your tractor has been standing idle for several months, here are a few things which should be done before driving it into the field. These simple precautions will add to the life of the tractor and may prevent costly repairs.

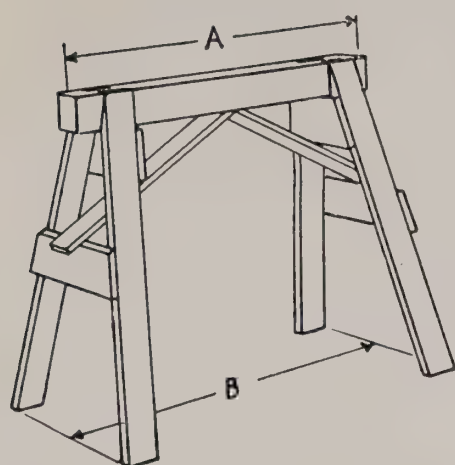
1. Drain the oil from crank case and flush it out with kerosene or light flushing oil. Refill the crank case with new oil.
2. Remove the spark plugs and pour about $\frac{1}{4}$ cup of light engine oil into each of the cylinders. Crank the engine by hand about 25 or 30 revolutions before replacing the spark plugs. This will distribute the oil over the cylinder walls, on the pistons, behind the rings and to the wrist pin bearings. During the long idleness the oil from these parts has drained down into the crank case and it requires a number of revolutions of the motor before oil reaches all of these parts. This precaution eliminates the rapid wear which takes place during that time.
3. While spark plugs are out, adjust the spark gaps before replacing them.
4. See that all working parts are lubricated.
5. Remove drain plug from the bottom of the transmission housing and allow any water to drain out. See that there is ample grease in both transmission and differential.
6. Fill the radiator and fuel tank.
7. Start the motor and allow it to idle at quarter speed for about five minutes before driving the tractor into the field.

Milk Can Makes Feed Box



By cutting the bottom from an old milk can and riveting one of the handles to the side, a very handy feed box can be made. Care should be taken to finish and smooth off cut edge. If it is desirable a measured quantity of feed can be placed in can before cutting, and the level marked so that the feeder may be cut at that point. This makes the feeder a feed measure, too.

Safe Saw Horse



Every horse, regardless of what it is to be used for, should be constructed so that the legs spread in all directions. The top should be shorter than the base so that it cannot tip over. Good bracing and use of sound material is important. The illustration shows one good type of construction.

(National Safety Council)

Sturdy Awl from Ice Pick

If you have an old ice pick, it's a simple matter to make it into a strong awl. Measure off the desired length, file a notch all around and break off at that point. Filing the end square for about an inch makes a good sharp point.

Protecting Silo Filler Against Rust

When you've finished using your silo filler for the year, first make sure that it is entirely clean and then, while it is still in motion, pour about a gallon of old crank case oil into the air holes alongside the blower. The fan will whirl the oil into all the working parts and inside of the blower pipes, coating them and lubricating them against rust and stiffness when the filler is started next season. The amount of the oil deposited will not be enough to damage the silage.

Preserve Tool Handles

An occasional rub-down of tool handles with linseed oil will preserve them, as well as improve their utility and appearance. The oil is applied from a cloth dipped in linseed oil.

To Mend Copper Tubing

First clean the broken tube carefully; then tightly wrap break or split with copper wire. Using a hot soldering copper, run a coat of solder all over the wire. This type of repair makes the pipe almost as good as new.

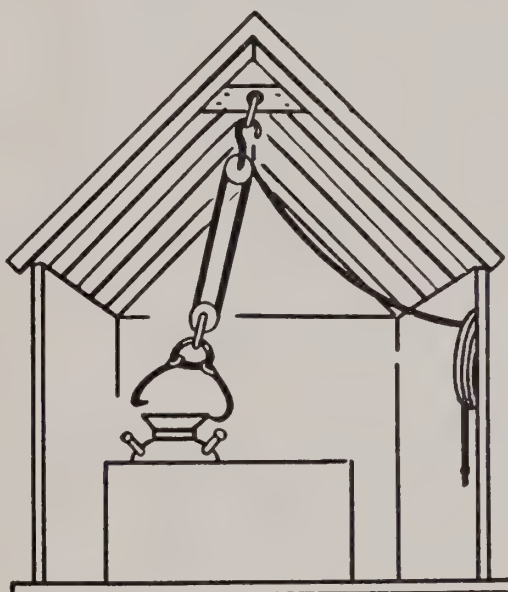
Driving Tacks in Tight Places

If you have difficulty driving a tack in a tight place or if it is too small to hold easily, try this idea. Stick the tack through a piece of paper, holding the paper so that the tack is in position for hammering. When the tack has been driven far enough to take hold, remove the paper and drive it home.

To Preserve Wagon Box Floors

To preserve and lengthen the life of the bottom of your wagon box or truck body give it an occasional coat of pure linseed oil. The oil should be heated to the boiling point and applied with a paint brush while it is still hot. A good heavy coat should be applied and left to stand several days before the truck or wagon is used. This will not only preserve the bottom of the box but it will also make it hard and smooth so that there will be less danger of damaging it when shoveling from the box.

Hoist for Milk House

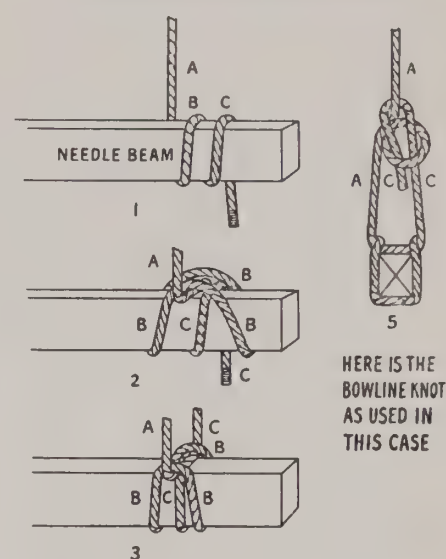


A block and tackle, permanently suspended from the top of the milk house, can save many backaches from lifting heavy milk cans in and out of the cooling tank.

There are many satisfactory arrangements, one of which is sketched here. Exactly how you build yours will depend on material available about the farm and the construction and arrangement of your milk house. The general idea is to provide hooks which can be easily attached to handles of the milk can, so that it can be safely hoisted and swung from the tank. In most cases satisfactory scrap material for this purpose can be found around the farm.

The cost of such an installation is small and it may be the means of saving many times its cost in personal comfort and even doctor bills.

Scaffold Hitch and Bowline Knot



The Scaffold Hitch is used to prevent the needle beams of suspended scaffolds from turning. The loose end of the rope is secured with a bowline knot.

1. Take two turns around the beam.
2. Bring end "A" forward between turns "B" and "C" then loop "B" over end of beam.
3. Pick up end "C" and adjust tautly, tying into "A" with Bowline.

Linseed Oil Preserves Wagon Wheels

Periodic soaking of wagon wheels in linseed oil will not only preserve and lengthen the life of the wheels but will keep the tires tight. This can be done by using a deep, narrow trough filled with linseed oil into which the wheel is set. If the wheel is not removed from the wagon the wagon can be slightly jacked-up so that the wheel will be free but immersed in the linseed oil. Turn the wheel every couple of hours until it is entirely soaked.

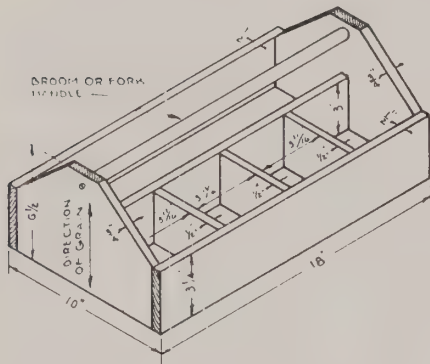
Wet Snow Won't Stick to Shovels

By coating shovels with melted paraffin, the annoyance of wet snow sticking to shovels can be overcome. This is really quite a labor-saver when one considers the extra effort necessary to knock snow off the shovel and the decreased capacity of the shovel if this is not done. Try it the next time you have wet snow to shovel.

Handy Twine Holder

To keep twine from tangling while tying corn shocks in the field put the ball of twine in an old pail. For a handy knife with which to cut the twine rivet an old binder or mowing machine section at the top of the pail so that it projects over the rim.

Tool Box for Quick Repairs



A tool box which can be taken to the field is a piece of equipment which will save many steps and costly delays. A suggestion for building one is shown in the drawing but you may wish to vary the small compartments for nails, bolts, washers, etc., to fit your own needs. A large compartment along one side holds tools such as hammer, wrenches, chisels, and pliers.

Causes of Common Mower Troubles

Excessive Draft

1. Dull or improperly sharpened knives.
2. Worn guard plates.
3. Cutter bar not in alignment.
4. Knife out of register.
5. Lack of lubrication.
6. Wearing plates badly worn.
7. Knife clips not properly adjusted.
8. Guard lips bent down.
9. Guards out of alignment.

Side Draft

1. Dull or improperly sharpened knives.
2. Worn guard plates.
3. Cutter bar not in alignment.
4. Knife out of register.
5. Wearing plates badly worn.
6. Knife clips not properly adjusted.
7. Cutter bar lifting spring improperly adjusted.
8. Drive wheel ratchet, dogs or pawls badly worn.

Breaking of Knives

1. Knife head guides and wearing plates badly worn.
2. Excessive play in pitman bearings.
3. Cutter bar not in alignment.
4. Guards loose or out of line.
5. Nicked and broken sections.
6. Knife out of register.
7. Knife clips not properly adjusted.
8. Guard plates loose or dull.
9. Wearing plates not properly adjusted or badly worn.
10. Wrong style of knife or knife head.

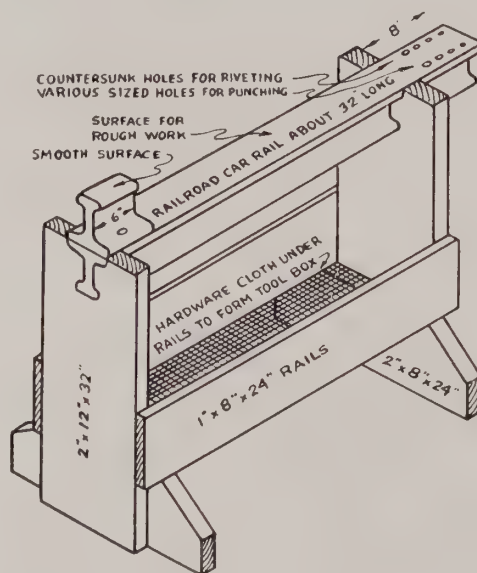
Lost Motion

1. Drive wheel ratchet, dogs or pawls badly worn.
2. Clutch not in adjustment or badly worn.
3. Gears badly worn.
4. Bushings worn.
5. Loose pitman bearings.

Uneven Cutting

1. Dull or improperly sharpened knives.
2. Worn guard plates.
3. Knife out of register.
4. Wearing plates badly worn.
5. Clips not properly adjusted.
6. Guards out of alignment.
7. Uneven adjustment of shoe soles.
8. Lost motion.

Handy Farm Anvil



A convenient anvil can be built for the farm shop from two pieces of railroad iron. One piece should be about 2 feet long and the other about 6 inches long. Build the frame as suggested in the drawing and set the large piece in place. Then fasten the short piece at one end in an upright position. Holes of different sizes bored in the longer rail are very convenient for punching holes in metal parts being repaired.

(Reprinted from North Dakota Extension Service Circular 180)

To Open Chain Stitched Bag

Here is a suggestion for both kitchen and barn. Usable sacking material comes to both. To save cutting the bag it is desirable to unravel the chain stitching. This is easy if started right. Remember to place the sack at right angles to you with the single stitching at your left, then begin unraveling the end nearest you. You'll find many uses for bags and sacking material if undamaged. The little extra care in opening the sacks is well worth the trouble.

Device for Windmill Pump Control

This device will keep your water tank filled without attention—regulating the operation of your windmill according to the water level.

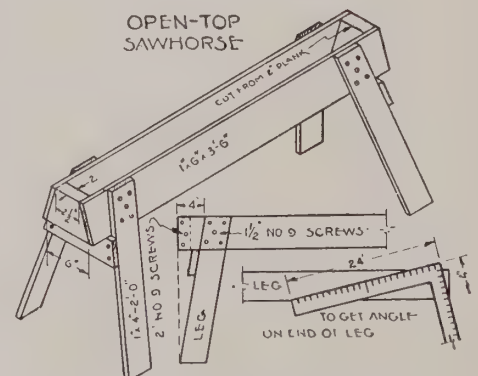
Operation is controlled by a balanced beam with a weight on one end and a float on the other. As the water level goes down the float drops too, acting as a weight to swing the beam downward. As water level rises the float is raised and allows the weight on the other end to swing the beam upward. Since the beam is attached to shut-off of windmill the swing of the beam governs the operation of the windmill.

The tank should be located close to the windmill base so the beam will not have to be too long to reach from the windmill out over the tank. Set a post close to the windmill, about one-third the distance to the tank. Over the post put a 4"x4" beam attached to the post by a hinge. The beam should be attached at a point about one-third its length with the larger end toward the tank. The beam is not attached at the center so that the comparatively light weight of the float will have enough leverage to operate the beam with the counterbalance weight at other end.

The wooden block float tied to one end with a length of cord should be heavy enough to act as a weight. The weight on the other end of beam (short end) should be sufficiently heavy to operate shut-off mechanism of mill and somewhat balance the beam. Adjust length of cord on float and the point of attaching beam to shut-off mechanism of mill to get desired range of operation. And there is your device ready to operate.

Open-Top Saw Horse

OPEN-TOP SAWHORSE



Open-top saw horses are handy, especially for ripping short boards and for cutting pieces too short to rest on two saw horses. They are easily made from scrap material and are light and easy to handle. A coat of paint will help keep them in good condition for a longer period of time.

(Reprinted from North Dakota Extension Service Circular No. 180)

Calibrate Planter Before Using

The seeding mechanism of a planter or lister can't be checked as efficiently while it is doing the seeding job as it can in the farm workshop ahead of time. Here's how to do it:

1. Block the drive wheel of the lister or planter off the floor.

2. Measure the circumference of the drive wheel and record this in feet.

3. Place some seed in the box, engage the seedshaft clutch, and turn the drive wheel several times after the seed begins to come through.

4. Place a pan under the seed tube. Make ten revolutions of the drive wheel, catching the seed in the pan.

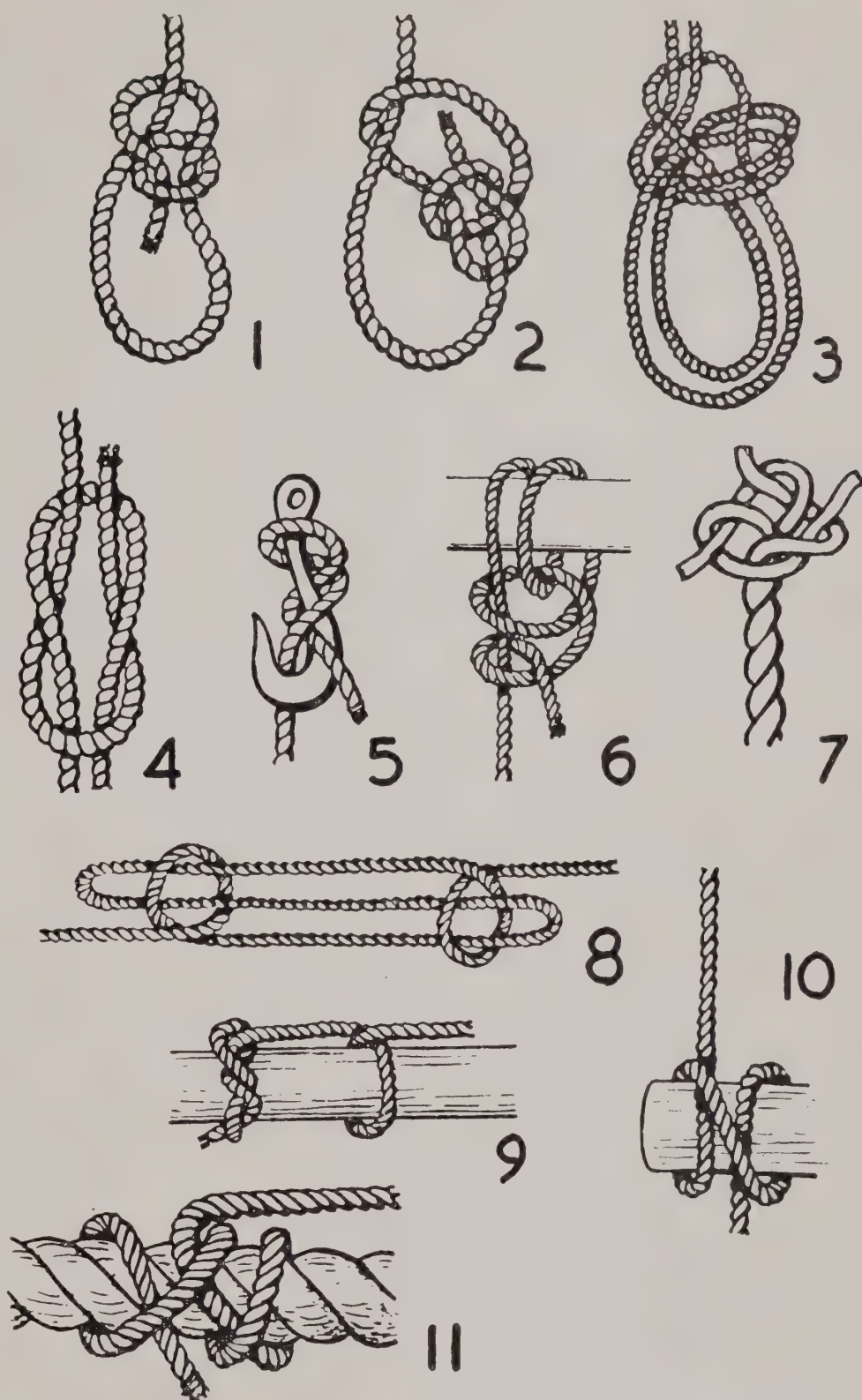
5. Count the seeds in the pan. Divide the number of seed by ten times the circumference of the drive wheel (in feet). The resulting figure will be the approximate number of seeds that would be planted per lineal foot when drilling corn.

The seeding rate of a lister or planter may be changed in three ways; first, by changing the sprocket or gear ratio between the driving axle and the seed plate drive gear; second, by changing the number of holes in the seed plate; third, by changing both the sprocket or gear ratio and the number of holes in the seed plate.

The proper seed plate for a given sample of seed may be obtained by sending seed to the implement dealer or branch house for a seed plate test, or, if necessary, blank plates can be drilled to fit the particular need.

Often, a representative quart sample of seed will enable the dealer to determine the correct seed plate to use, but if he is not equipped to do this testing he can send the sample on to his branch house. Along with the seed furnished the dealer should go this information: The model number of the planter or lister; the width of the row; the number of kernels per hill if checking or spacing is desired; and the sprocket arrangement to be used with the desired plate.

Agricultural engineers at the University of Nebraska point out that several factors must be considered if a farmer plans to drill his own blank plates. Some of these are the number of holes in the seed plate, the size of the hole, shape of hole, thickness of the plate, size of the seed and condition of the seed box. There are as many combinations of these factors as there are models of listers and planters. Since there are variations in seed, too, there is no general solution that will fit all cases.



Dependable Rope Knots, Hitches and Slings

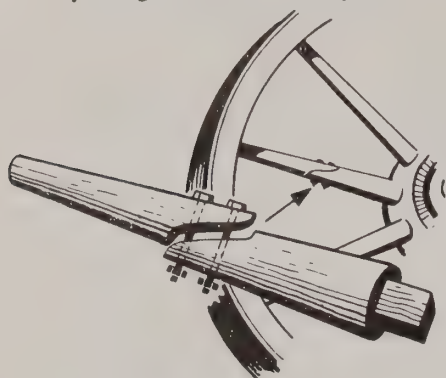
1. **Bowline**—Gives a loop that will not slip under strain, and can be easily untied when strain is released.
2. **Running Bowline**—Passing long end through loop makes good slip knot.
3. **Bowline on a Bight**—Makes comfortable emergency sling to sit in.
4. **Square or Reef Knot**—for joining ropes together.
5. **Double Blackwall Hitch**—for hitching rope to a hook for hoisting.
6. **Fisherman's Bend**—for fastening

a rope to a ring or anchor.

7. **Wall Knot**—used to prevent unstranding and act as a stopper.
8. **Sheepshank**—for shortening a rope or to pass by a weak spot.
9. **Timber Hitch and Half Hitch**—for lifting spars. Can be easily loosened when strain is taken off, but will not slip under a pull.
10. **Clove Hitch**—for fastening staving to upright or securing loose ends.
11. **Rolling Hitch**—for hauling spar or large cable.

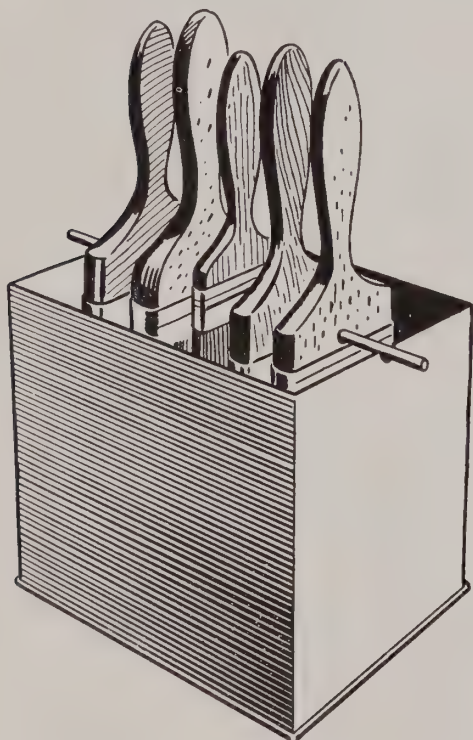
National Safety Council Safety Instruction Cards.

Replacing Broken Wheel Spokes



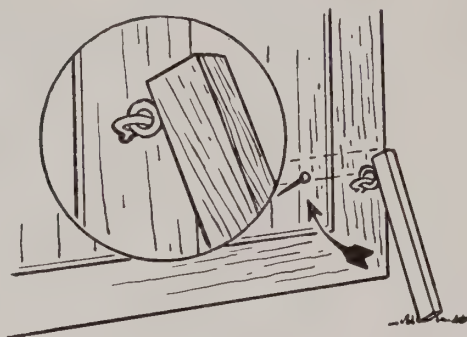
It's quite a job to take a wagon wheel apart to replace a broken spoke. Here's a way to make the replacement without all the trouble. Cut the new spoke into two parts as shown in the sketch and bolt them together with a couple of $\frac{3}{16}$ inch bolts after the two halves have been placed in position. Use washers on each side of the spoke to keep the bolts from digging into the wood when they are drawn tight.

Protecting Paint Brushes



If brushes are allowed to rest on the bristles when placed in oil or water in a jar or can between painting jobs, the bristles will turn up and, in time, the brushes will be ruined. This can be avoided if the following practice is followed. Cut the top off a gallon varnish can about seven inches from the bottom. Cut a notch about $\frac{3}{4}$ -inch deep in each end as shown. Drill holes in the handles of brushes just above the ferrule. Brushes can be supported in oil or water in the can by passing a heavy stiff wire through the holes and resting the ends in the notches in the ends of the can.

To Hold Doors Open

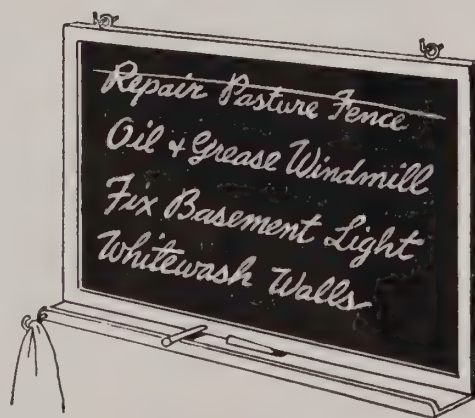


Two $1'' \times 1\frac{1}{2}''$ boards about 18 inches long will hold your garage doors open. Using screw eyes, attach one end of a board to the inside of each door. The boards should be hung low enough to drag on the ground a little. When the door is opened, the board drags on the ground and when the door attempts to swing shut, the board catches in the ground and jams the movement of the door in that direction. A nail is driven into the door at one side of the board so that the board can be swung over and rested on the nail, holding it out of the way when not needed.

Renewing Old Carpenter Square

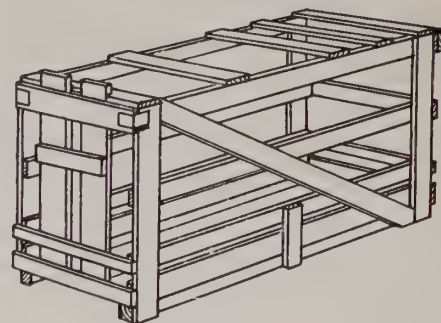
If your carpenter square is rusty, dull and hard to read, the following renewing method is recommended. Clean thoroughly using steel wool to remove excess or loose rust. Give the whole square a coat of white paint, then before it has dried, wipe paint off leaving the paint in the stamped numbers and number lines so they will remain white and easy to read. After remaining paint has dried, oil square thoroughly to prevent further rusting.

Keep a Job List Posted



There's no excuse for anyone to wait for the "boss" to come home and tell him what to do if a list of jobs to be done is kept posted where everyone can find it.

Satisfactory Hog Shipping Crates



Hog shipping crates must be strongly built to hold the animal, but they should also be light weight to save transportation costs. For 225 to 500 pound hogs, the crates should be 2 feet wide, 3 feet 4 inches high, and 6 feet 6 inches long. For pigs weighing under 100 pounds, the measurements are 1 foot wide, by 2 feet high, by 3 feet 10 inches long. For those weighing from 100 to 225 pounds, suggested dimensions are 1 foot 6 inches wide, by 2 feet 9 inches high, by 4 feet 9 inches long.

(Reprinted from University of Illinois Extension Service Circular 554)

Rope and Block Sizes



The choice of proper size blocks for a rope of given size has a lot to do with safety and the life of rope. Sheaves that are too small produce unnecessary wear on the rope and increase the friction load.

The best practice is to use the largest blocks that can be used giving due consideration to ease in handling, etc.

Recommended block sizes are as follows:

Size of Rope	Size of Block
Diameter	Designated by length of shell in inches
$\frac{3}{8}''$	3"
$\frac{1}{2}''$	4"
$\frac{5}{16}'' - \frac{5}{8}''$	5"
$\frac{3}{4}''$	6"
$\frac{13}{16}'' - \frac{7}{8}''$	7"
$\frac{7}{8}'' - 1''$	8"
1"	9"
$1\frac{1}{8}''$	10"
$1\frac{1}{4}''$	12"
$1\frac{3}{8}''$	14"
$1\frac{1}{2}''$	15"
$1\frac{5}{8}''$	16"

National Safety Council Safety Instruction Card No. 88.

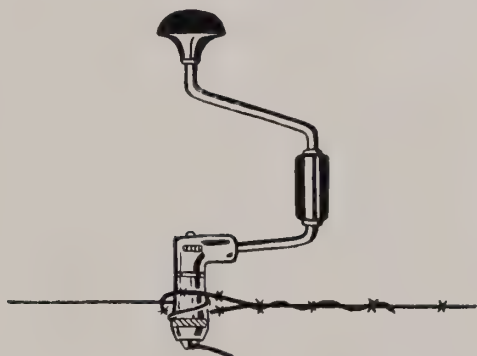
FENCING SECTION

Republic Wire Gauge

The following table of sizes, weights and length of steel wire will often come in handy for reference purposes, as, for example, when you wish to know the number of feet in a 100 pound coil of 9 gauge wire.

Republic Steel Corp. Gauge	Diameter in Inches	Pounds per 100 Feet	Feet per 100 Pounds
4.....	.2253	13.54	738.6
5.....	.21875	12.76	783.5
6.....	.2070	11.43	875.0
7.....	.1920	9.832	1017.0
8.....	.1875	9.377	1066.0
9.....	.1770	8.356	1197.0
10.....	.1620	7.000	1429.0
11.....	.15625	6.512	1536.0
12.....	.1483	5.866	1705.0
13.....	.1350	4.861	2057.0
14.....	.125	4.168	2400.0
15.....	.1205	3.873	2582.0
16.....	.1055	2.969	3369.0
17.....	.09375	2.344	4266.0
18.....	.0915	2.233	4478.0
19.....	.0800	1.707	5858.0
20.....	.0720	1.383	7232.0
21.....	.0625	1.042	9598.0
22.....	.0540	.7778	12860.0
23.....	.0475	.6018	16620.0

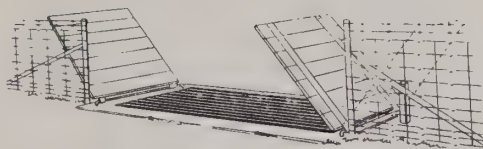
To Mend and Restretch Broken Wire



You can make your broken wire tight as new by adding a piece of smooth wire as a connecting link between the two broken ends. Here's how to do it.

Splice a piece of smooth wire securely to one end of the broken wire and make a stout loop in the other end of the broken wire. Slip the loop over the chuck of an ordinary brace, then pass the linking wire through the loop, around the chuck of the brace and lock it in the jaw of the chuck. When the brace is revolved the linking wire will be drawn through the loop and wound onto the chuck. When the wire is tight enough, unwind the brace, being careful not to lose tension on the wire. The fact that the linking wire is drawn through the loop makes it easy to fasten without losing tension.

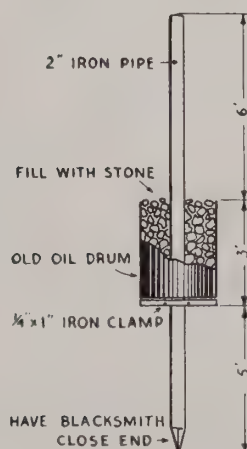
Hinged Stock Gap Cover



A stock gap is a mighty handy way of keeping livestock in a field without the necessity of opening and closing a gate every time you drive in and out of the field. With such an arrangement it is usually necessary to locate a drive-through gate, adjacent, for the passage of livestock. The stock gap itself may be made to serve this purpose by constructing wings or guards of planks which may be dropped down on the stock gap when livestock are to be driven through.

The wings or guards should be constructed of two-inch planks making them of sufficient size to completely cover the gap. The planks can be joined together by two heavy pieces of strap iron which are allowed to project at the outer edge of the guard and curved to form a hinge. By placing posts to hold them at an angle as shown, they will also serve as guards to prevent stock from approaching the stock gap from the sides.

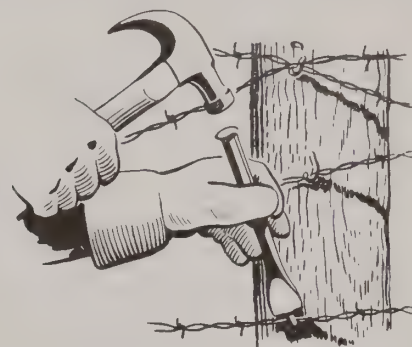
Posts for Fences Extending Into Lakes or Streams



Farmers having pastures along lakes or streams frequently have trouble keeping fence posts in place where the fence extends out into the water.

A post constructed as shown in the illustration will remain fixed throughout the year and will withstand the pressure of ice in the spring. The oil drum filled with stones will give the post the necessary rigidity to withstand almost any strains ordinarily encountered.

Removing Old Fence Wires from Wood Posts

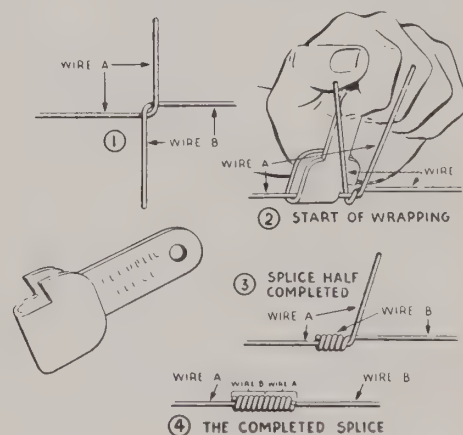


If fence is to be removed from old wood posts, a cold chisel and hammer will enable you to quickly remove the old fence wire as illustrated. Always wear heavy gauntlet type gloves to avoid injury to the hands and arms.

Protecting Fence and Barbed Wire in Storage

Here is a good plan to forestall rusting and add to the life of temporary fences and barbed wire in storage. Spray them well with oil every two or three months while they are being stored. A large hand insect spray can be used for the purpose and a medium grade motor oil should be employed.

Splicing Smooth Wire



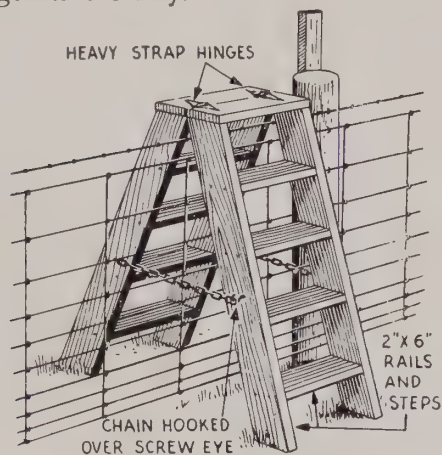
The "Western Union" splice illustrated above is recommended for splicing smooth wires such as brace wire, electric wire, etc. Each strand should be wrapped at least five times around the other. In the case of small diameter soft wire several additional wraps are desirable. While ordinary pliers may be used in making the splice, there is danger of injury to the coating on the wire and the use of a good splicing tool such as that illustrated is recommended.

Fence Stiles

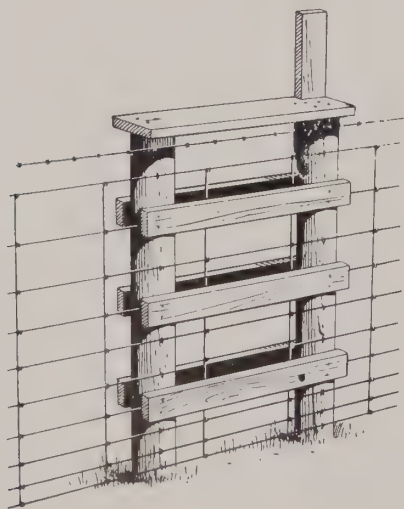
One of the most frequent causes of fence trouble is the breaking or bending of line wires or loosening of fastenings caused by persons climbing over the fences. Most of this damage can be avoided by the construction of stiles in such places where the traffic is not heavy enough to warrant the use of gates. Stiles should be placed at convenient crossing places wherever there is occasion to cross the fence. Paths will usually determine most suitable places for their location. In long fields two or more stiles may be needed.

The following illustrations show three types of stiles, including a portable type which can be moved to any convenient point.

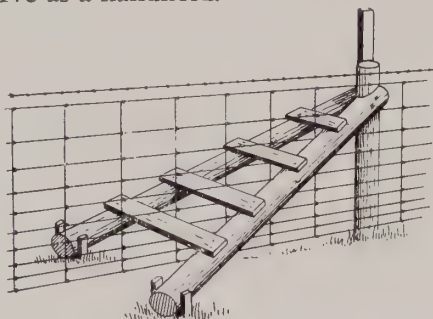
In constructing any of these stiles, care should be taken to use only sound material and to nail or spike all pieces together securely.



Portable Stile—This type of stile can be transported easily to any needed crossing place. Both rails and steps should be made of 2"x6" finished material and the two sections should be hinged together with heavy strap hinges. Light chains passed through the fence as shown prevent the legs spreading apart. This type of stile should always be set up close to a post and chained or wired to the post to prevent tipping.

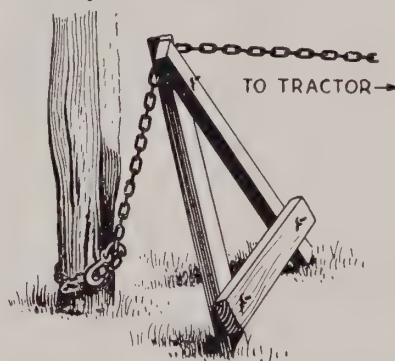


In-Line Stile—This stile has the advantage of not projecting out into the field on either side of the fence line. It does, however, require the setting of an extra post. Rungs should be made of material approximately 2"x4" and the top step of 2"x6". Nail a piece of 2"x4" securely to one of the posts to serve as a handhold.



Rail Stile—This type of stile must be used in connection with a wood post but can be constructed of either rough or finished lumber. In event that finished lumber is used, side rails should not be lighter than 2"x6" and rungs 2"x4". A piece of 2"x4" securely nailed to the post so as to project about two feet above the top of the post provides a handhold by which the user can steady himself when at the top of the stile.

Easily Constructed Post Puller



A simple but effective post puller can be made from three pieces of 2" x 4" or 2" x 6" bolted together to form a triangle as shown. Hook a chain around the bottom of the post and pass it over the apex of the triangle. A slight pull by horse or tractor will quickly remove the post.

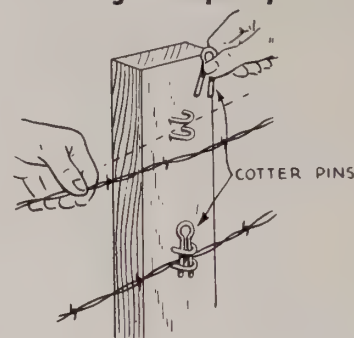
Staples Drive Easier

To drive staples more easily into hard wood, pour a little oil over them. They will not only drive easier, but will bend over less frequently, and the oil provides added protection against rusting.

Good Staple Puller

An old worn-out mowing machine guard will make a good staple puller. Drive the point of the guard through the staple between the wire and the post.

Fastening a Temporary Fence



Here is a very quick and effective method of fastening temporary fences to wood posts.

Merely drive two staples into each post for each strand of the fence, spacing them about one-half inch apart. Pass the strand between the staples and, holding the wire against the post, insert a cotter key or nail through both staples in front of the wire. To remove the fence, just remove all the pins or nails from the staples.

Selecting and Preserving Wood Posts

When wood posts are used in a fence line, considerable care should be used in their selection and certain kinds should not be used without preservative treatment.

The Bureau of Agricultural Engineering, U. S. Dept. of Agriculture, states in Information Series No. 28 (1932)—

"The most effective preservative for wood fence posts is creosote. The method applicable to use on the farm is described in Farmers' Bulletin 744, 'Preservative Treatment of Farm Timbers.' A copy of this bulletin may be secured by applying to the Superintendent of Documents, Government Printing Office, Washington, D. C."

Average Life of Untreated Wood Posts

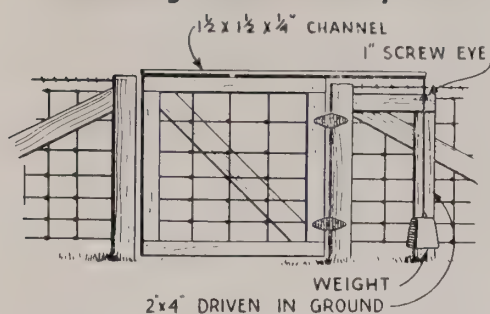
(In Years)

Osage Orange..30	White Oak ..11
Locust .....24	Tamarack ...10
Red Cedar ....20	Cherry .....10
Mulberry .....17	Hemlock 9
Catalpa .....16	Sassafras 9
Bur Oak .....15	Elm 9
Chestnut .....15	Ash 9
White Cedar ..14	Red Oak 7
Walnut .....12	Willow 6
Pine .....11	

In the above figures on the durability of various woods, it should be borne in mind that the rating applies to heart wood only. The sapwood of any species is not durable and should be avoided whenever possible. Post-split large trees will contain a smaller percentage of sap wood than when the entire small tree is used.

(Reprinted from "Farm Fence Handbook")

Self-Closing Garden or Poultry Gate



It's so easy to leave the garden or poultry yard gate unlatched when you are coming through with your hands full of eggs or vegetables. It's difficult to unlatch and open such gates, too, when you are thus encumbered.

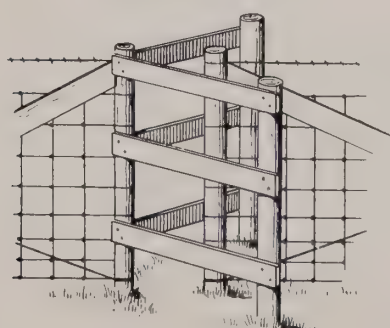
Here is a double acting gate that will eliminate those conditions. A slight push will open it and it swings back into position when you have passed.

The closing arm may be made from 1 1/2"x1 1/2"x1/4" angle iron, about 18 inches longer than the gate itself, fastened to the top of the gate with heavy wood screws. If a steel gate with pipe frame is used, the angle iron can be bolted to the top of the frame through holes drilled through the pipe. Double acting hinges should be used, permitting the gate to swing either way.

The rope (or a rust protected chain) is fastened to the end of the closing arm and passes through a one-inch screw eye screwed into a piece of 2"x4" which has been driven into the ground and securely fastened to the gate post brace. The weight on the opposite end of the rope or chain quickly returns the gate to the closed position after you have passed through. This weight may be an old iron casting or paving brick.

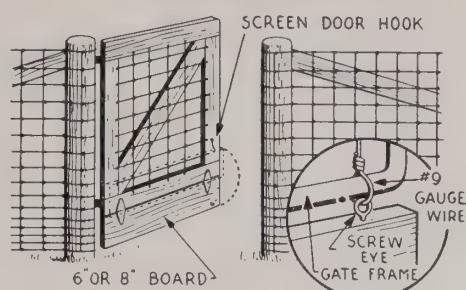
It may be necessary to bend the projecting end of the angle iron slightly to bring the rope fastening directly over the screw eye when the gate is closed.

Walk-Through Gate



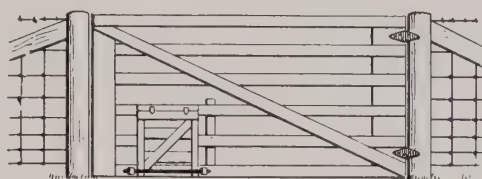
The gate shown in the illustration is very handy as it permits a person to walk through from one field to another while barring the way to cattle and other large livestock.

Dragless Walk Gate



Here's a solution to the problem of the walk gate that drags in the mud or snow. Just raise the gate six or eight inches and fasten a board of about that width to the bottom with a pair of strap hinges. When it is necessary to use the gate while it is muddy or a heavy snow lies on the ground, swing the board up and hold it in position with an ordinary screen door hook. If a steel gate is used, the "hinge" shown in the circle can be employed.

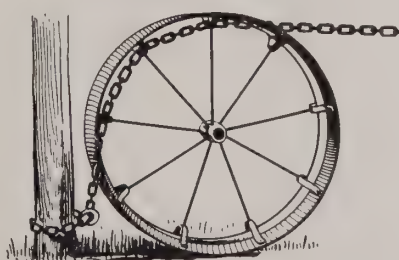
Double Purpose Gate



Here's a handy gate arrangement for separating hogs from cattle or allowing the hogs to enter the cattle pasture without opening the large gate and running the risk of the cattle getting out.

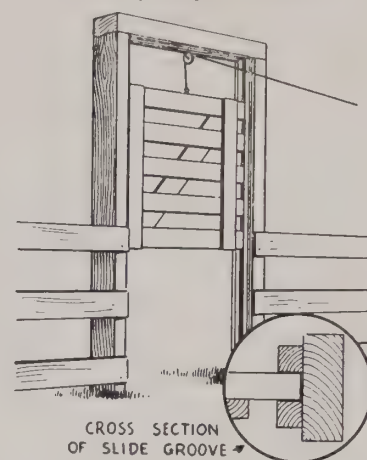
The small gate section is built into the large drive gate. Hinges are provided on the top or side and it may be held shut by a bar or a hasp which can also be used to hold it in the open position.

A Simple Post Puller



If you have an old planter wheel and a log chain handy, it's easy to make this simple but very effective post puller. Wrap the chain about the bottom of the post and place it between the two sections of the split tread. A slight pull by a tractor or team of horses usually brings the post out of the ground.

Handy Hog Pen Gate

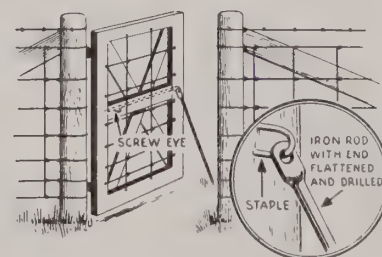


Hog raisers frequently find it difficult to separate the stock sows from pigs they wish to pen up for fattening. The usual plan is to have a man standing at the gate which leads from the pen to the enclosure where the fattening animals are to go, ready to open or close the gate as required. Often the hog which is to be moved from the drove starts toward the gate but becomes scared at the sight of the man and turns back.

This simple gate shown in the illustration eliminates this difficulty as it can be opened and closed readily from any point on the platform.

If a little grease is placed in the slide groove, the gate may be raised by a slight pull on the rope. When the tension on the rope is released, it quickly drops down, barring the way to passage of the animals. When in the closed position, it cannot be opened by pressure from either side.

Gate Holder



If you find it necessary to hold a swinging gate open, here's an idea that will solve the problem. Flatten one end of a piece of 1/2" rod and drill a hole in the flattened part to take a large size staple. Sharpen the other end of the rod so it will dig into the ground. Fasten the rod to the gate with the staple as shown. A 1/2" screw eye opened up can be driven into one of the cross pieces of the fence to hold the rod out of the way when it is not being used.

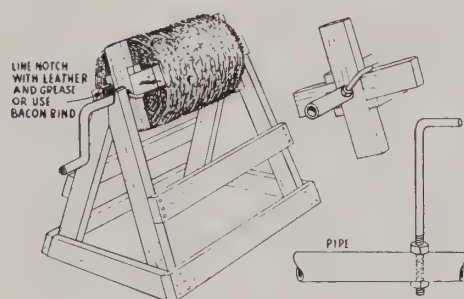
Barbed Wire Handler



Here is a device which makes it safe and easy to handle barbed wire. It consists of a framework of two pieces of 2" x 4" about four feet long, spaced about 12 inches apart. The cross pieces may be made from 1" x 2" boards. Drill holes in each end of the 2" x 4" pieces to permit a piece of half inch gas pipe to be inserted. The pipe at the top serves as a handle and that at the bottom as an axle for the barbed wire reel.

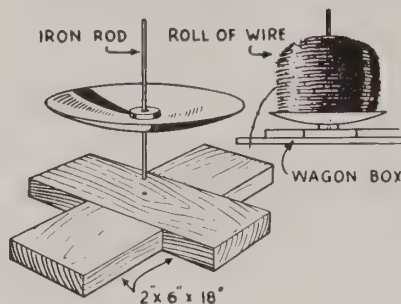
Insert the barbed wire reel so that the wire will unroll from the bottom. All you have to do is to pull on the handle as shown in the illustration and you will be able to lay your barbed wire easily and without danger of anyone getting scratched or injured. It's much easier than the old-fashioned way of unrolling the reel from a pole carried by two men.

Barbed Wire Reel



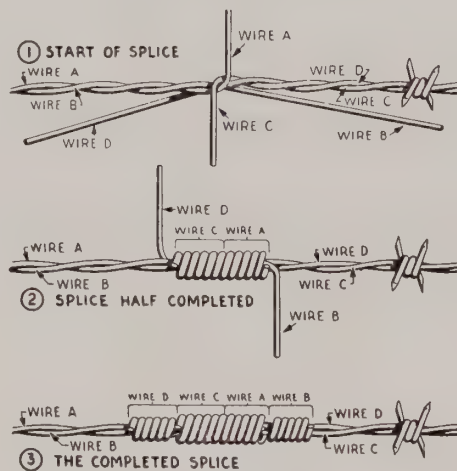
Here's a husky, easily-constructed reel for taking up barbed wire. The framework and reel are built of 2"x4" lumber and the shaft and crank can be made from a 3/4" steel rod bent to shape, or lengths of 3/4" pipe joined with 90° elbows. A piece of 1/4" rod bent and threaded as shown at the right is passed through a hole in the shaft and held in position with two nuts. The hook engages the reel, causing it to revolve when the handle is turned. A washer and pipe cap or nut on the end of the shaft keeps it from sliding out of the groove. The device can be mounted on the back of a wagon, truck or trailer and the reel is easily removed by lifting the shaft out of the notches.

Unroller for Barbed Wire



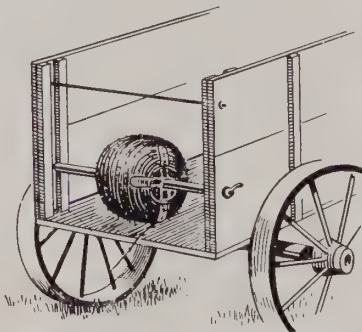
An old disc, two pieces of 2" x 6" about eighteen inches long and a piece of one inch rod or 3/4 inch pipe are the only materials required. Make a cross of the two pieces of 2" x 6", drill a hole in the center to take the pipe or rod and assemble as shown.

Splicing Barbed Wire



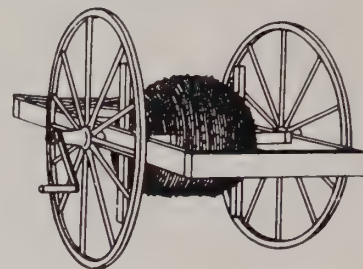
In splicing barbed wire, the most satisfactory method is to split the strands and "Western Union" each wire around the other and the opposite piece, giving each five turns separately.

Barbed Wire Stringer



An easy way to string barbed wire from the back of a wagon, truck or trailer is shown in the illustration. Use a piece of one inch gas pipe the same length as the width of the inside of the wagon or truck box. Pass the pipe through the spool. Then slide the end gate tie rod through the lower hole in the sideboard of the box, through the pipe and out through the lower hole in the opposite side board.

Reel for Old Barbed Wire



Here is a handy rig for safely handling old barbed wire when removing or building new fences.

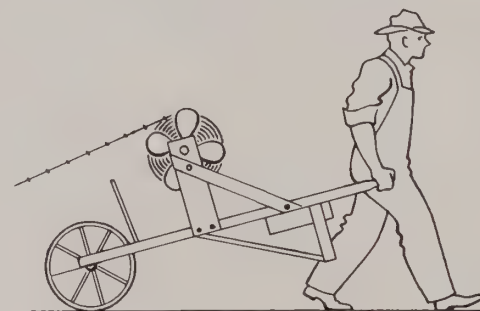
You can use any kind of old wheels but buggy wheels are to be preferred because they are lighter. The size makes no difference as long as the fingers of the reel clear the ground by about six inches.

Gas pipe or bar steel about one inch in diameter can be used for the axle. Holes are drilled into the axle for the pins which fasten the reel and crank in position, thus permitting the reel to turn when the crank is turned.

The frame of the rig is made of 2" x 6" planks spiked together as shown. Holes are drilled in the middle of the side planks to accommodate the axle. A plow clevis fastened to the front end of this frame forms a guide for the wire.

To roll up the barbed wire it is simply necessary to wrap one end several turns around the reel and then turn the crank. The rig rolls forward as the wire is wound on the reel.

One-Man Barbed Wire Unreeler



If you have an old wheelbarrow on hand, it's a simple matter to make a barbed wire unreeler that can be handled easily by one man. Place two up-rights each about a foot high, near the front of the wheelbarrow, bracing them toward the handle. Holes through the up-rights will carry a shaft on which the reel of barbed wire will turn. By pulling the wheelbarrow, the barbed wire will play out automatically. A box nailed to the inside of one of the two wheelbarrow handles can serve to hold tools, staples, etc., if desired. A lid on the box may keep these from bouncing out.

Circus-Type Post Puller

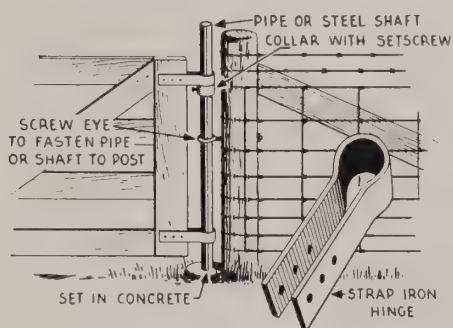


Circus men who have lots of posts to pull quickly when the circus finishes its night performance use a device like that pictured here. You can easily make such a puller out of scrap materials to be found around any farm.

An old pair of wheels and an axle provide a suitable truck. A short axle is to be preferred or a piece of round steel of suitable diameter can be used. A heavy piece of hardwood is bolted to the axle and an old wagon pole is used as a lever.

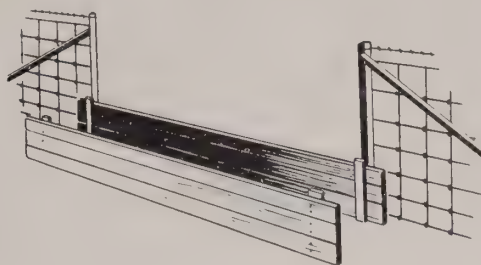
The operation of the rig is very simple. A chain is wrapped around the post near the ground and hitched over the end of the lever. By bearing down on the other end of the lever, the post is withdrawn with very little pressure.

Dragless Drive Gate



If you have trouble opening and closing a gate due to the fact that it drags in the mud and snow, here's an answer to your problem. Use loop hinges of heavy strap iron shaped to fit around a steel shaft or piece of pipe. Set the pipe or shaft in concrete about 1½ inches in from the end post and fasten it to the end post by means of screw eyes. A collar which fits the shaft and a set screw to hold it in place makes it possible to raise the gate so that it will clear the snow or mud. If pipe is used, the same result can be accomplished by drilling holes about two inches apart in the upper part of the pipe and inserting a bolt in one of the holes to hold the gate at the desired height. This construction has the added advantage of allowing the gate to swing either way.

"Cattle Only" Gate

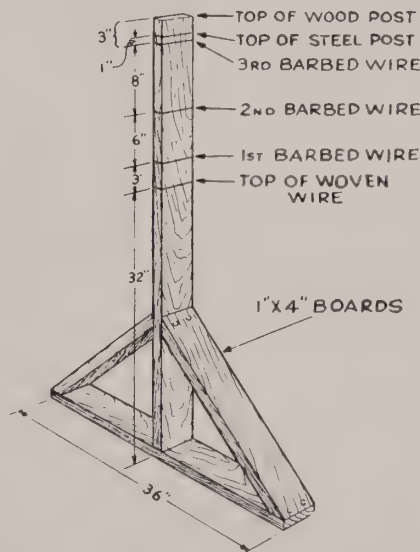


The illustration shows an arrangement which will permit cattle to pass from one field or pasture to another while successfully barring the way to hogs.

The "chute" is made of planks about eighteen or twenty inches high. One side of the chute is placed against the fence posts and the other is placed about twenty inches in front of it and held in place by 2"x4" or heavier posts driven into the ground.

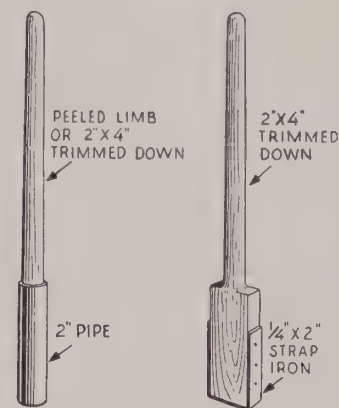
The cattle can step over the planks into the adjoining field but hogs are only able to walk between them. This is a simple yet very effective way of handling hogs and cattle in the same field.

Marker Saves Time When Building Fences



You can save a lot of time when erecting fences by using the simple post marker shown above. It is easily constructed of 1"x4" boards and the spacing can be indicated by notches or, if the upright is painted a light color, by black lines. If the latter system is used, each corner can be marked, making the device useful for erecting four different styles of fence. Reference to a good fence erection manual will show how it should be marked for sizes other than that illustrated. When using the marker, just place it alongside the post and mark the post at the points indicated on the marker.

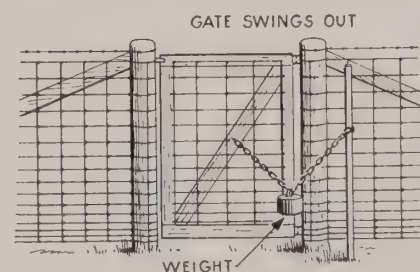
Post Tampers



In many types of soil, the permanence of the fence is largely dependent on the degree of thoroughness with which the soil is tamped down around wood posts. If a tamper is not available, one can easily be made from materials usually found around the farm, as shown above.

In making the tamper shown at the left, use a limb about 2½" in diameter at the large end or a trimmed down 2"x4". Slip the pipe over the small end and force it down over the limb or 2"x4" until it is wedged tightly. Saw off that part of the limb or 2"x4" which projects at the bottom so that it will be flush with the end of the pipe.

Simple Self-Closing Yard Gate



Here's a simple way of making any yard or poultry gate that swings one way self-closing. Drive a steel fence post inside the fence (opposite the direction in which the gate swings) about one foot in from the fence and about a foot back from the post to which the gate is hinged. Fasten one end of a piece of light chain (the side chain of an old tire chain will do) to the post with No. 6 gauge wire, staple or wire the other end to the gate as shown, and attach a weight to the chain at about the middle. Be sure the chain is long enough to permit the gate to be fully opened.

Temporary Fence Saves Time

Use of temporary fence to make a lane to the pasture will save the time required to drive the cows to the field each morning.

Fencing on the Contour

Right:

Contour lane following the ridge top with contoured fields on each side. Straight sections of fence are used with well braced corners where the direction is changed to conform approximately to the contour.

Photograph by Courtesy of the Soil Conservation Service.



Left:

Contour cattle lane 90-rods long separating rotation hog pastures. Lanes which follow the contour are not subject to the formation of gullies like those which are built straight up and down the hill.

Photograph by Courtesy of the Soil Conservation Service.



For years agricultural experts and fence manufacturers have been stressing the desirability of avoiding or straightening crooked fence lines in the interest of greater efficiency and ease in handling crops in the fields. Good farm operators have profited by this advice. This is still good practice for the farm that lies on level ground. In fact, as farm implement manufacturers have speeded up both tractors and the equipment they power, the saving in cost and ease of operation in fields bounded by straight sides takes on even greater importance.

With almost every rule however there is an exception. During the past few years national attention has been directed to saving the soil and farmers on rolling or hilly land have become conscious of the amount of soil which is moving off their fields by the process of erosion. Contour and strip farming supplemented in some cases with terracing have now been tried by enough farmers to take these erosion control

measures out of the purely experimental class so they may be dealt with as new but practical methods of farming.

Farmers who have adopted these new methods report savings in tractor fuel and time, and less wear and tear on equipment than formerly experienced in farming up and down the hills. Since erosion is reduced, more of the water is absorbed by the soil, contributing to higher crop yields.

The change from square farming to round-the-hill farming is not being made without creating new problems—one of which relates to fencing. Herein lies the exception to the rule regarding straight fence lines.

With new crop areas laid out to follow the contour of the hills many long point rows are likely to be encountered if the farm has previously been fenced in the customary manner. Point rows adjacent to division fences between adjoining farms will probably have to re-

main point rows although in a few cases the owners of such farms have adopted contour boundaries. Something can and should be done, however, about the fences within the farm boundary which divide the various fields.

As with any problem regarding the layout or relocation of fences it is usually best to make the changes first on paper. Mistakes made on paper can be easily erased; not so with an actual fence after spending time and labor to make the change. Photographs of farms are now available at a nominal cost in many sections of the country as a result of aerial surveys made by the government. The locations of present boundary and division fences, lanes, streams, etc., can be traced from these photographs on tracing paper to provide a splendid work map. Where such photographs are not available, suitable maps may be made by actual land measurements.



This fence was used as a guide to plant corn on the contour. Two braced-post assemblies were used to change the direction of the fence. A three row cultivator is shown in operation with a terrace in the background.

Photograph by Courtesy of the Soil Conservation Service.

Starting with such a map, the location of new fences should be indicated by dotted lines with suitable indications for such portions of existing fences as must be removed or relocated.

Several principles should be observed in establishing new fences to fit this method of farming. First, a fence crossing a slope should follow along the contour. Such a fence will serve the important function of a guide line in plowing and planting the field in subsequent years after the first contour guide stakes

have been removed. Second, fences may parallel a natural waterway. If this waterway is a ditch or a stream the fence may be placed on firm ground on one side or the other. Third, a fence may be placed on a ridge where it obviously will not interfere with the contour operations.

Of course it will not be possible to work out a perfect field arrangement on every farm but the above principles should be kept prominently in mind in determining the location for each fence. Usually it will be necessary to

relocate lanes as well as division fences in this program to give livestock proper passage to newly created fields distant from the farmstead. By proper planning, one lane in some instances may be so located as to serve all or at least a majority of the distant fields. Utilizing a permanent pasture as a connecting link in the lane system may reduce the length of the lane fence it is necessary to construct. The location of the lanes as well as the gates opening to the various fields should be carefully laid out on the farm map as a part of the fence program.



A recently completed permanent contour fence. The strip of vegetation on the left will remain in pasture. The field at the right, laid out on the contour, will be in a strip crop program.

Photograph by Courtesy of the Soil Conservation Service.

Having determined the location for the new fences and the approximate size of the fields they will enclose by use of the farm map, the contour lines should be staked out on each field by the use of a farm level. This contour line will also mark the location for the fences.

Contour fence building will differ from straight line fencing in several ways. The line posts must not only serve to hold the fence in a vertical position and at a proper spacing above the ground, but also to resist the lateral thrust as the fence is stretched. To meet this added requirement the posts should be spaced closer together than in the case of straight line fencing. Instead of the usual spacing of one rod it may be necessary on relatively sharp curves to space the posts 10 to 14 feet apart depending on the height and weight of woven wire to be applied. Placing an occasional steel post in concrete or wood posts about six inches deeper than ordinary will lend more stability to the fence. More brace posts will also be needed. In general they should be placed at points where there is a marked change in direction of the curve of the fence to permit stretching the fence in relatively short sections.



Building a Terrace in South Carolina.

Although it is possible to stretch 40 rods or more of fence in a straight fence row at one time, 10 to 15 rods will probably be the maximum with contour fences. Never attempt to stretch around two curves swinging in different directions at the same time. In other words, stretch each section of an S curve separately.

Instead of building the fence exactly on the contour line some farmers prefer to follow this line only in general by constructing a series of straight line fences making a more severe change of direction at each brace post. While this practice may require more brace

post construction, it will permit the use of line posts of customary lengths.

When wood posts are used on a contour line, the bearing side of the post should be placed against the firm soil. A rock or stone wedged between the bottom of the post and the other side of the hole will help to hold the post vertical. Above ground bracing of posts should preferably be placed directly in the line of the fence since braces extending out into the fields on either side make mowing of weeds difficult and also interfere with operation of other field machines. The use of steel braces with formed ends which may be bolted to the posts will prove much more satisfactory than the use of wood braces. It is very difficult to keep wood braces properly in place.

The use of good materials—good fence, barbed wire and posts—is, of course, essential to a good fence. Add good workmanship in erecting the fence and you have the key to years of satisfactory service and low maintenance cost.

For further information on the subject of soil conservation consult your county agricultural agent, farm advisor or state agricultural college.



A Southern Cotton Field Planted on the Contour.

Gully Control and Reclamation

With growing consciousness of the importance of soil conservation to the future of American agriculture, farmers generally are showing increasing interest in the subject with the result that there has been an ever-widening use of erosion control practices such as terracing and contour and strip cropping.

Another phase of soil conservation which calls for careful study, particularly on older farms, is the control of gullies with the final goal of reclamation or prevention of further soil loss. Theoretically, if a farm contains land in varying stages of erosion, it is logical to protect the best land from further loss first, but it is usually more practical to begin with the gullies if they are not too far gone.

Although attempts have been made to group gullies into classes and prescribe treatment accordingly, such a grouping is made impractical by the many variables which must be considered. Such factors as location and dimension of the gully, side and longitudinal channel slopes; size, shape, prevailing slope, cover and drainage conditions of the watershed; type of soil and purpose of the control measures (that is whether the gully is to be filled and restored to planting, partially filled and used for drainage or merely protected against further enlargement) will form the best basis for the plan of treatment.

While rainfall is the primary cause of erosion, it is the number and intensity of the rains rather than total annual rainfall which determines the intensity of such activity. In the final analysis, therefore, it is the volume and rate of run-off which is most important in determining possible methods of control. Run-off, in turn, is a measure of the net effects of various combinations of the factors named above.

Treatment of Small Gullies

Very often, diversion of the water by means of terracing and cultivation will eliminate the trouble from small finger gullies and prevent their en-

largement. Accidental or adventitious gullies which may have had their origin in a wagon rut or cattle path may safely be filled with straw and the sides plowed in.

Gullies approaching the upper limit in size for the "small" classification may be controlled by means of series of checks made of bags of sod or by various patented devices. The latter include sections of heavy wire bent into prongs and crimped into light channel beams and corrugated metal checks made complete in one unit. The prong check sections, 3 feet long and 1½ feet high, are light enough to be handled readily and can be moved from one location to another as the fills become made. The corrugated metal check is double reverse curved in plan and is particularly well adapted to side ditches along highways.

To prevent formation of small gullies in cultivated fields, it is frequently recommended that sod strips be left undisturbed along the flow line of swales and depressions. If the sod strips are wide enough, this practice is usually effective.

Check Dams in Control of Larger Gullies

Control of gullies is largely a matter of reducing the speed of water flowing through them after heavy rains. This is accomplished by constructing a series of checks which, in time, transform the channel of the gully from a uniform, steep slope into a succession of "steps" with low risers and long, flat treads. These checks are usually temporary and are intended to hold the fill and prevent washing while vegetation for permanent control is becoming established. If the purpose is to completely fill the gully, intermediate checks, midway between the original ones, are constructed later and this process is repeated as many times as may be necessary.

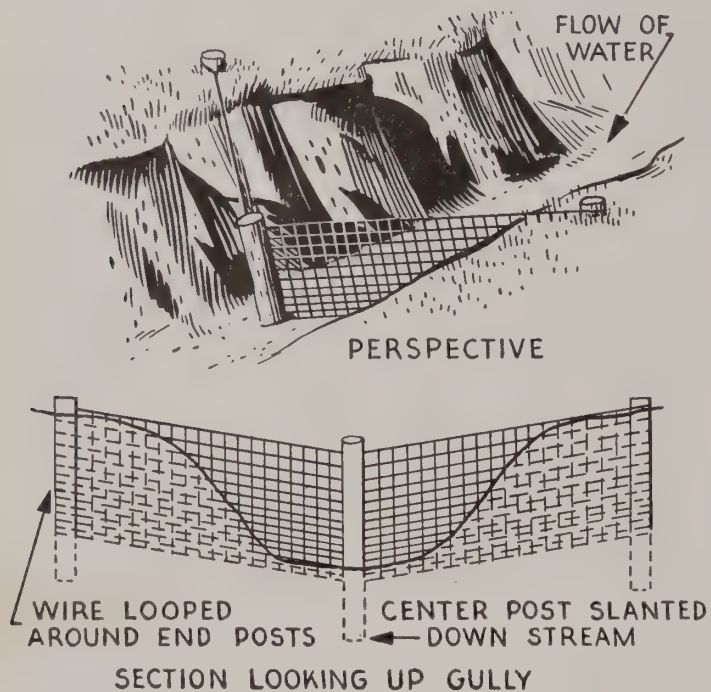
When the fill is completed, future drainage must be diverted by terraces or the fill must be left under cover of undisturbed sod to prevent recurrence of gullying.

Substantial checks of creosoted planks, masonry or concrete are required where it is necessary to rely on these alone for permanent or semi-permanent control. Earth dams with drop inlet culverts are usually resorted to when both the gully and its watershed are large. So many factors ranging from cost to available materials and including many variables of terrain enter into the planning and construction of soil-saving structures of this type that each individual case becomes a separate problem. Therefore, it seems fitting that this discussion be limited to the more common temporary check dam.

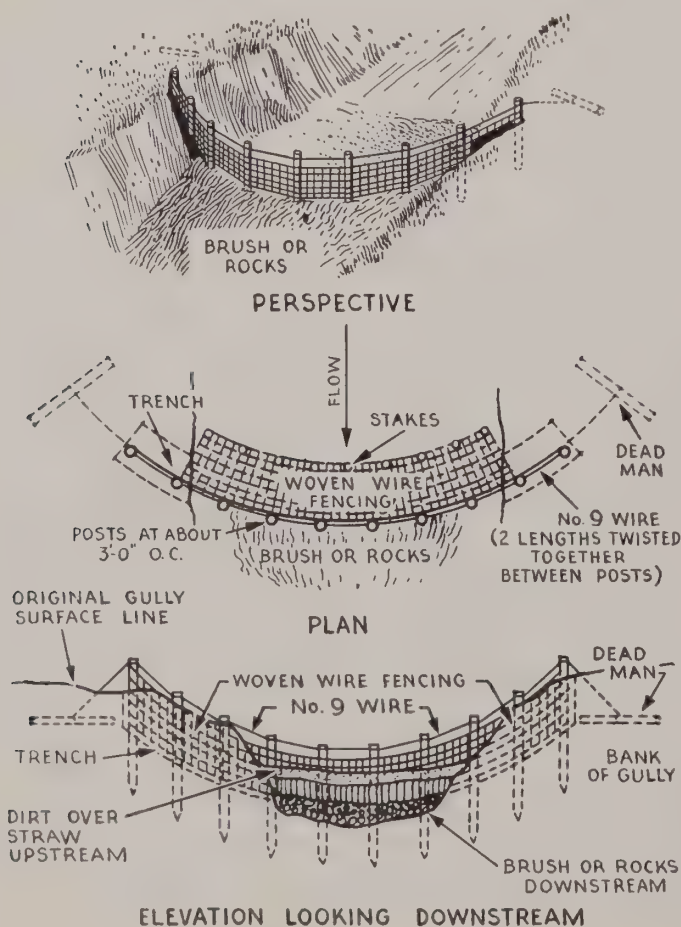
Temporary Check Dams

Temporary check dams are usually distinguished from permanent or semi-permanent soil-saving dams by the fact that they are generally constructed of inexpensive and temporary materials in medium and small gullies and that dependence for ultimate protection is placed on vegetation or some form of plant cover. They catch and retain small quantities of soil until vegetation gains a foothold. Naturally if, for any reason, vegetation fails to start, all that has been accomplished by the check dams will be lost as soon as they disintegrate. It is important, therefore, to fence out all stock as a protection of the work performed in building the dams. Since brush is usually readily available, the most economical type of check dam is that built of brush held in place by posts set across the gully. This type of dam is tedious to build, however, and very difficult to render and keep even partially water-tight. In addition, inspection is necessary after every rain as the failure of one of the checks may lead to rapid deterioration of the entire check dam system.

However, comparatively inexpensive and, when properly constructed, highly dependable and efficient check dams can be constructed of woven wire fence anchored to posts set across the gully as described and illustrated on the next page. The most suitable type of woven wire fencing is one with a close spacing of line and stay wires.



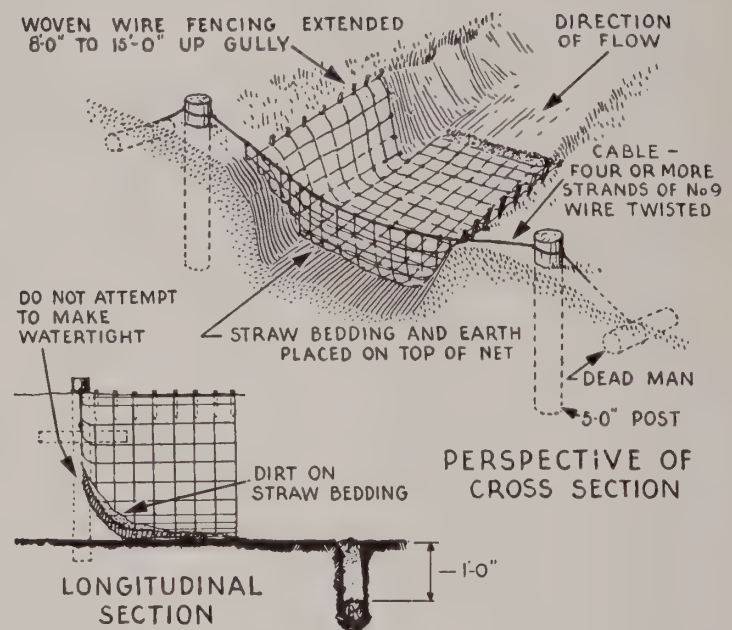
V-Type. The V-type check dam is designed for use only in V-shaped gullies or those with very narrow bottoms and small watersheds. The deep set center post leans downstream and should not extend upward more than 18 inches above the gully floor. The woven wire should be trenched into the floor and banks of the gully as shown in the illustration above.



Fixed Basket Type. In building the fixed basket dam shown above, posts are set $2\frac{1}{2}$ to 3 feet apart across the gully and into trenches dug into the banks. Strips of woven wire are stapled to the posts and another strip is wired crosswise to the bottom of the first, carried upstream the width of the strip and anchored by stakes into a cross trench below the gully floor. The basket thus formed is partially filled with straw and earth and, if necessary, an overfall apron is built of rocks or brush. A piece of No. 9 gauge wire is threaded in and out of the woven wire and around the tops of the posts and anchored to "dead men" in both banks, insuring that all the posts will act as a unit, even though one may be broken or washed out.

(From "Recommendations for the Control and Reclamation of Gullies", Iowa Eng. Experimental Station Bulletin No. 121.)

Suspended Net Type. The suspended net type check dam illustrated above is comparatively simple and may be used where the gully floor is fairly flat. End posts should be set at least



five feet deep and well back from the edges of the banks. Additional resistance to the heavy stress to which they are subjected is secured by anchoring their tops to "dead men." The cable is formed of four or more strands of galvanized wire twisted together or a commercial cable may be used. Strips of woven wire are wired endwise to the cable and, while hanging loosely, are bent and swung upstream eight to fifteen feet, where they are anchored. Each strip is then fastened with wire to its adjacent strips and the bottom of the "basket" is covered with straw and earth. Care should be taken to see that the woven wire extends to the tops of the banks which have been sloped and smoothed to make a snug fit.

This type of dam catches a fill both upstream and downstream, probably because of its ability to break up or "filter" the water into fine streams or sprays. It is flexible and, as the fill increases, a load is placed on the cable, which causes it to assume the form of a flat curve and leaves the filled gully wide and shallow with gently sloping banks, a form easy to maintain.

Suspended net checks are adaptable to medium size gullies and ordinarily require no apron if properly spaced. The dam farthest down the gully in a series, however, should not be of this type since the gradient below it is made steeper causing the fill caught by one rain to be washed out by the next.

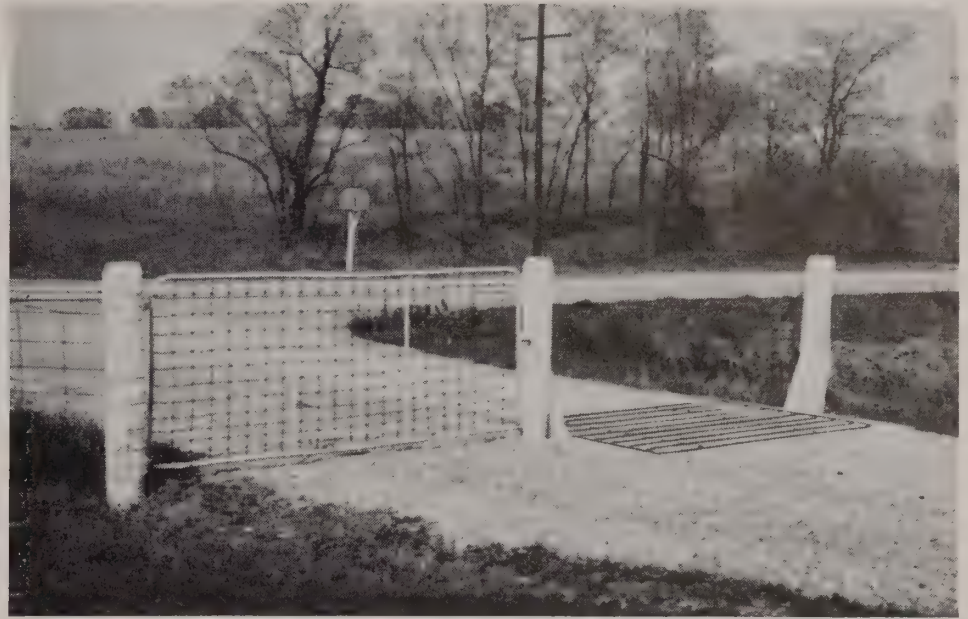
Stock Guards

Opening and closing of gates at the end of frequently-used lanes is a source of annoyance and inconvenience when passing through with an automobile. Many farmers have solved this problem by providing a stock guard adjacent to the gate similar to that shown in the accompanying illustration.

The guard forms an effective barrier to the livestock and the gate, therefore is provided for passage of teams and livestock when necessary.

The pit which forms part of the guard should be 12 to 18 inches deep below the grate or bars and 4 to 6 feet wide to control larger livestock. A concrete wall 6 to 8 inches thick should be used to line the pit. The wall will also serve as support for the grate. Steel pipe about 2 inches in diameter and spaced about 6 inches center to center will furnish adequate support for automobiles. If the gate is to be made strong enough to support loaded trucks, the use of small I-beams or discarded railroad rails is recommended. If the spacing of the pipe or rails is too wide, severe jolting will occur with possible damage to the supports from heavily loaded trucks.

It is desirable to make some provision for drainage of the pit and the grate should be removable. Kerosene or old lubricating oil may be used to con-



Kentucky Stock Guard Supplemented by a Gate.

trol mosquitoes or weeds if they prove to be a bother.

If sheep or goats are to be controlled by such a guard, V-shaped wings covered with woven wire and sloping from the ends of the pit to the fence or gate post should be provided. These animals will cross over if a smooth place 2" or more wide exists.

Flood Gates

Fencing across small streams subject to overflow presents a problem requiring special treatment if upkeep of this

section of the fence is to be kept at a minimum. Some type of flood gates such as that illustrated below offers the best solution. These gates will rise and fall with the water level, allowing debris carried by the flood stream to pass under and, at the same time, offering a barrier to livestock.

The gate is suspended from a steel pipe, rod or cable, depending upon the width of the stream, substantially anchored to a post on each bank. If the stream has steep irregular banks or is of appreciable width it will probably be desirable to construct the gate in sections, each of which will be free to move independently. The horizontal members should be kept at a minimum since they naturally will tend to collect driftwood and floating vegetation.

For control of hogs, the vertical members should be spaced fairly close whereas the spacing may be increased considerably if cattle or horses only are to be controlled.

The nature of the stream should be considered in determining whether to carry the main fence across the stream above the flood gate. If the stream is very wide or subject to extreme rise during flood stage it will probably be better to terminate the fence at each side. For such an arrangement the end posts should be set back from the bank of the stream a sufficient distance to obtain solid support for the posts. A short separate length of fence should be installed between the permanent end post and the flood gate.



Flood Gate in Central Indiana.

Double Span End and Corner Post Assemblies



The steel braces used here are easily fastened in place and prove very effective.



An effective double span corner assembly in a well-constructed fence.

The effectiveness of the conventional method of building end and corner assemblies has been well demonstrated for many years. If properly constructed, one need have little concern over the ability of the construction to continue in good condition for a long time. Observations show, however, that many farmers either do not appreciate the necessity for proper anchorage or are unwilling to go to the trouble necessary to assure it. The result is poor construction, loosened fence and high maintenance. Even though the farmer were willing to go to the trouble necessary, it would still seem desirable to attempt to discover methods by means of which the results could be more easily attained.

The principal difficulty in building a fence end or corner arises from the fact that the force applied by the fence is some distance above the surface of the ground, while the resistance provided by the soil lies below the ground. This results in a couple or, more simply stated, a tendency to rotate, pulling the corner or end post from the ground. Various means have been employed to hold the post down. Anchored posts or anchor wires attached to "dead men" have been the most approved methods. Various expedients such as anchors to solid objects, including stumps, or hanging large boulders, have been resorted to. These are unsightly, temporary in effectiveness and of doubtful value in saving of time.

To compare the performance of two types of assemblies over a period of time, a single span assembly and a double span were set 30 rods apart. An anchor post was set midway between the two ends to furnish a place to in-

sert a dynamometer, as well as a fixed end, so that the individual characteristics of the construction could be studied. The fence was composed of 832-6-11 woven wire with four strands of barbed wire above. Line posts were spaced a rod apart. The single span end consisted of a 9-foot span with a 6-inch end post and a 5-inch brace post. The double span end consisted of an 8-foot, 9-inch span and an 8-foot span. The end post was 4 inches in diameter and the other two were 3 inches. No supplementary anchors were used in either assembly.

All end and brace posts were set 3 feet, 6 inches in the ground. The woven wire was stretched until the tension curves were half removed and 250-pound tension was placed on each strand of barbed wire. A dynamometer in the line indicated a total tension of 2900 pounds. After five months, the horizontal movement of the single span assembly was nearly 30% greater than that of the double span and the vertical movement was 19 times as much. The single span required more material for construction than the double span.

The double span shows even greater superiority when used in corner construction. The reason for this is found in a study of the type of failure in each case. The single span end fails by rising out of the ground. The double span end is pulled through the ground and may tend to buckle because the fence really pushes on it instead of pulling. When the single span is used in a corner, the load on each fence must be reduced because the resultant of the two tends to pull the corner post from the ground on the bisector of the angle formed by the two fence lines.

Not so with the double span assembly. One fence line tends to prevent movement of the other in a lateral direction, with the result that both assemblies are stabilized. With devices available, it was not possible to pull the double span corners to destruction. It was apparent, however, that it was possible to load each fence comprising the corner as heavily as was possible when the assembly was tested as an end. The double span corners held more than 200 per cent of the load of any single span corner with only 50 per cent or less of the horizontal movement.

The posts used in the time test mentioned above are somewhat small. The purpose was to find the minimum for satisfactory performance.

The following sizes are recommended. The lengths of span are optional but, if the posts are so spaced that an 8-foot compression brace can be used, the total will be approximately one rod, which makes for easy spacing and also helps simplify calculating field acreages if the line posts are also spaced one rod apart.

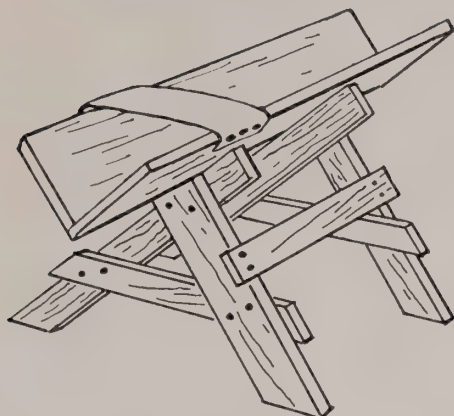
End Post	5-inch diam.	8 feet long
Brace Posts	4-inch diam.	8 feet long
Compression Braces (Wood)	4-inch diam.	8 feet long
Compression Braces (Steel)	2-inch O. D.	8 feet long
Tension members—Two double strands of No. 9 wire.		

If the wood posts are not treated for decay-resistance, they should be larger to allow for deterioration.

Reprinted from "The Farm Fence Handbook" by Prof. Henry Giese, Revised April, 1942.

LIVESTOCK SECTION

Holder for Vaccinating Pigs



The right equipment makes any job easier. If you have a large number of shoats to vaccinate, it is well worth the trouble to make up a holder to hold the pigs during the operation. It is easily made.

Make a trough about three or four feet long of good husky ten-inch boards. For legs use four pieces of 2"x4", securely fastened to the side of trough in an X form. Legs can be any length that will bring the trough to a convenient height for the veterinarian to work on the pigs. Cross-brace the X of the legs on each end. The thickness of the cross-brace should be considered when attaching the legs since the cross-brace will be nailed in one direction on one leg, and in the other direction on the other leg.

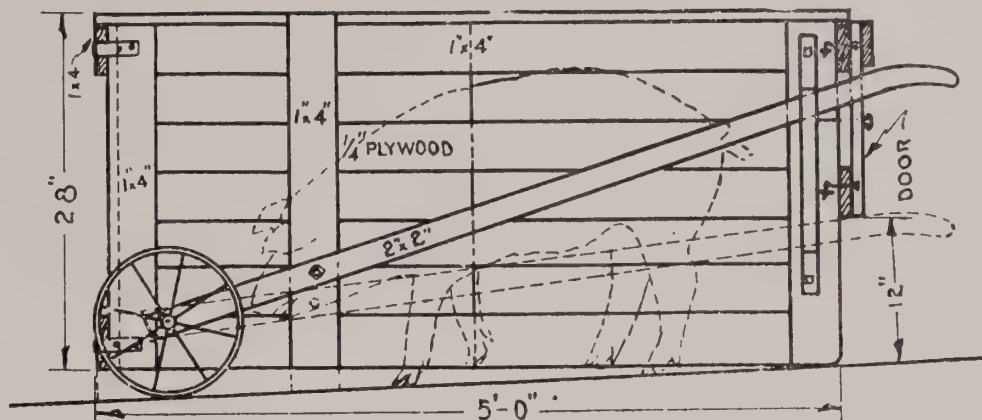
Therefore, the legs should be separated by the thickness of the material used on the cross-brace. This is so the brace will nail up flush with each leg. A good stout side rail should be nailed on each side, attaching the two sets of X-legs.

Across the trough, about one or two inches from one end, a strong piece of binder canvas, about three or four inches wide, should be securely fastened, leaving plenty of room for the pig's head under the canvas. The space from the end of the trough to the edge of the canvas provides for a breathing space for the pig.

When the pigs are lifted into the trough on their backs, they are slid endwise so their heads slip under the canvas. The trough firmly holds the pig during vaccination.

In making this trough, be sure to make it sturdy and strong, so that there will be no danger of collapse.

Handy Crate for Moving Hogs



Two wheels (about 12 inches in diameter) fastened to the front end of a floorless wooden crate provide the principal "makings" for a handy hog moving crate for individual animals. Handles similar to those on a wheelbarrow are fastened along the sides of the crate and bolted so they can be used to raise, lower, or turn the crate. The hog can be driven into the crate through the door, or the crate can be picked up and placed over him. Sheet metal or plywood at the sides along the front shuts off the hog's side view. The open slat front appears to the hog to be the only chance for escape so he simply walks along on the ground following the movement of the crate.

Suggested Rations for Sows During Gestation

During gestation, the period when the brood sow is carrying her young, feeding and exercise are most important. There should be plenty of good feed so that the sow will not need to starve her own body to nourish her unborn pigs. However, just as important as the quantity of feed is the balancing of the ration.

No. 1

50% ground oats
50% corn or barley
Skim milk
Green leafy alfalfa
or clover hay

No. 2

30% corn
30% ground barley
30% ground oats
10% tankage or
5% tankage and
5% soybean meal

No. 3

33% corn
33% oats
33% shorts or
middlings
Skim milk or tank-
age
Alfalfa hay

Fattening feeds include corn and barley. Feed enough of either or both to keep sows in good condition.

In feeding twice a day, year old or older sows will need 1½ to 2 pounds

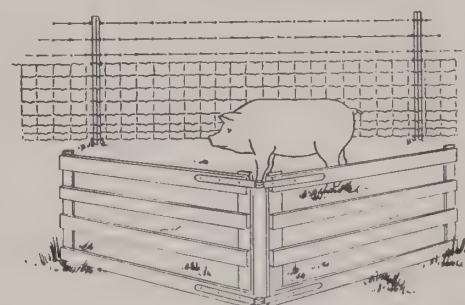
per day of grain for each 100 pounds of live weight. Gilts will need 2 to 3 pounds for each 100 pounds of live weight. Corn can be fed at the lowest cost when on the cob. Grinding barley will increase its feeding value about 30 per cent.

Protein feeds are skim milk, buttermilk, tankage, oilmeal, soybean meal, alfalfa, etc. Brood sows need any one or a mixture of these. Milk is a most valuable source of protein when available, but the others are satisfactory. Results favor a combination of two or more. Three pounds of skim milk to one pound of grain will about balance the ration. If skim milk is not available, 1/3 to 1/2 pound of tankage or soybean meal or a combination of protein may be fed each day.

Leafy alfalfa hay is also an excellent source of needed proteins, minerals, vitamins, and bulk. It is especially valuable to guard against rickets or posterior paralysis.

(From "Care and Feeding of Brood Sows", University of Minnesota Agricultural Extension Service Folder, No. 90)

Gate-Type Hog Catcher



Two simply constructed gates hinged together can be used to catch a hog in the lot without the necessity of driving him into a corner. The hog can be approached and trapped at any point along the fence.

Suggested Rations for Swine

A. Suckling Pigs, 5 to 40 lbs. (feed in creep):

1. Corn 80 lbs., tankage 20 lbs.
2. Corn 40 lbs., hominy 40 lbs., tankage 20 lbs.
3. Corn 75 lbs., middlings 10 lbs., tankage 15 lbs.
4. Corn 30 lbs., ground barley 30 lbs., ground oats (screened) 25 lbs., tankage 15 lbs.

B. Weanling Pigs, 30 to 100 lbs.:

1. Corn 80 to 85 lbs., tankage 15 to 20 lbs.
2. Corn 75 to 80 lbs., middlings 10 lbs., tankage 10 to 15 lbs.

C. Shoats, 100 to 175 lbs.:

1. Corn 85 to 90 lbs., tankage 10 to 15 lbs.
2. Corn 75 to 80 lbs., middlings 10 to 15 lbs., tankage 10 lbs.
3. Corn 50 lbs., ground barley, wheat or rye 40 lbs., tankage 10 lbs.
4. Corn 60 lbs., ground oats 30 lbs., tankage 10 lbs.

D. Hogs, 175 to 250 lbs.:

1. Corn 92 to 96 lbs., tankage 4 to 8 lbs.
2. Corn 60 lbs., ground barley, wheat or rye 35 lbs., tankage 5 lbs.

For pigs weighing 75 pounds and up, well started on pasture, the tankage may be reduced by one-half.

Skim milk or buttermilk may replace part or all of the tankage in above mixture; 2 quarts per pig on pasture to 4 quarts per pig in the dry lot should be available to replace all the tankage. With lesser amounts, the tankage in the mixture may be reduced proportionately.

E. Brood Sows

1. Corn 60 lbs., whole or ground oats 35 lbs., tankage 5 lbs.
2. Corn 60 lbs., wheat middlings 35 lbs., tankage 5 lbs.
3. (For sows nursing pigs) corn 60 lbs., oats 30 lbs., tankage 10 lbs.

Access to legume hay in rack or pasture.

4. (For sows nursing pigs) Corn 50 lbs., barley, rye or damaged wheat 40 lbs., tankage 10 lbs.

Legume hay or pasture.

Two gallons of skim milk per sow per day may be used in place of the tankage.

Trinity or Trio Mixture

To be self-fed with corn or other grains.

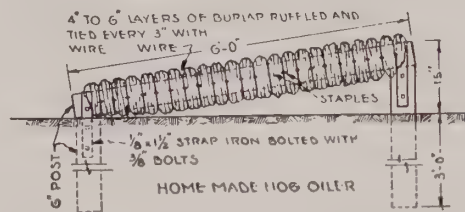
(Protein Supplement for Hogs)

Tankage	2 parts
Vegetable protein	2 parts
(Cottonseed, linseed or soy-bean oil meal)	
Alfalfa	1 part

Mineral Mixture

Finely ground limestone	2 parts
Steamed bone meal	2 parts
Salt	1 part

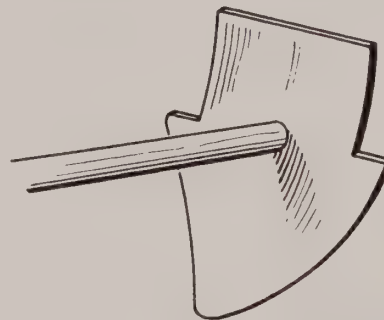
Home Made Hog Oilers



When making the common type hog oiler, made by wrapping an oil-saturated burlap bag around a post, best results will be achieved if the post is set at an angle of about 60 degrees instead of straight. This gives the hog a greater surface on which to rub. From 4 to 6 layers of burlap should be used, pushed together to form a ruffled surface and tied every three inches with wire, stapled to the post.

A further improvement is to cover a 6-foot post with the burlap layers and fasten it at an even greater angle to two posts, one end flush with the ground and the other end about 15 inches above the surface. This allows a hog to straddle the oiler at the low end and to rub against the high end, thus doing a thorough job of oiling himself.

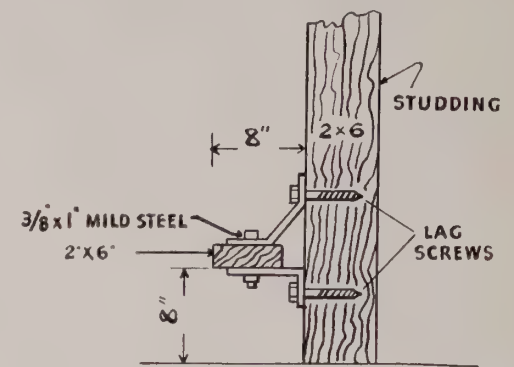
Cleaner for Hog Troughs



A good practice for any hog raiser is to provide clean troughs at all times.

A handy cleaning device may be made from a cultivator shovel by attaching a handle about 2 feet long. This tool is especially useful for the common V-shaped type of trough. On other troughs an old spade heated and shaped to the contour of the trough will serve the purpose.

Pig Fender Saves Little Pigs



With the government calling for more and more hogs under the Food-for-Europe program and with prevailing pork prices, it is both patriotic and profitable to raise more pork. While it may not be possible to farrow more sows, it is more important than ever to raise all the pigs to marketing weights.

The pig fender or guard illustrated above is one good way of preventing loss of small pigs through crushing against the wall when the sow lies down. It can easily be made of materials which are readily available and should be placed on each side of the farrowing pen.

Strong, Easily Cleaned Hog Troughs



You can make two strong, easily cleaned troughs for the slopping of hogs out of an old hot water tank. Just cut it in half, using a cutting torch or chisel, and file or grind the rough edges to avoid injury to the hogs. Supports, placed at each end, can be made of wood or from strap iron welded or riveted to the sides of the trough.

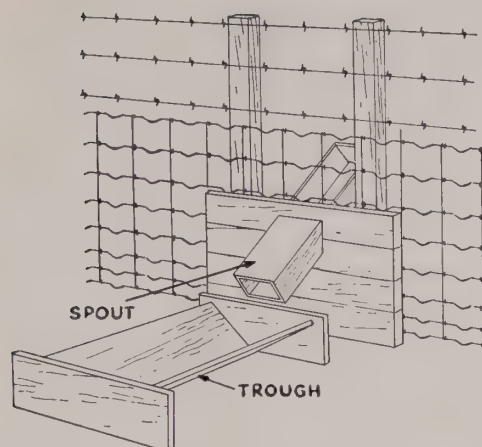
To Stop Strange Hogs from Fighting

When you must turn a strange group of hogs in with your regular group first smear used oil on both groups. An old paint brush can be used for this purpose. The oil destroys the odors by which one group of hogs would be able to detect the other group and thus gives them no cause to fight with each other.

Save Time Feeding Hogs

Allow the end of the hog trough to project about a foot outside the fence. This will not only save steps but also eliminate the possibility of the animals spilling the feed pail before it can be emptied into the trough.

Easy Pig Feeder



This pig feeder saves steps and avoids the trouble of fighting with the hogs to keep them from knocking over the buckets of milk and feed. The spout is set to pass through the fence at a steep angle and so it empties directly over the feeding trough. At feeding time you merely have to pour the feed into the spout from the outside of the pen. Be sure the spout is well braced.

It will probably be necessary to cut some of the wires of the fence to permit the spout to pass through. Be sure these wires are stapled to the posts on either side and staple the loose ends to the two-inch pieces which hold the spout.

Definitions of Feeding Terms

Concentrates. Feeds such as grains, cottonseed meal, and tankage which are rich and supply a large quantity of feed per unit weight.

Roughages. Feeds such as hay, straw, roots and silage which are coarse and bulky in nature.

Legumes. Plants such as clover, alfalfa, cowpeas, and soybeans which have nodules on their roots containing bacteria that can take nitrogen from the air. Legumes are generally richer in protein and minerals than other roughages.

Nutrients. Nourishing substances in feeds.

Protein. The only nutrient which can produce growth and make repairs in the animal's body. Lean meat, skim milk, wheat bran, cottonseed meal, and tankage are some of the feeds which contain relatively large quantities of protein.

Carbohydrates and Fats. Nutrients which produce fat, heat, and power to do work in the animal's body. Fat is about two and one-fourth times as valuable for these uses as carbohydrates. Feeds containing large quantities of starch and sugar are rich in carbohy-

drates, while large quantities of fat are contained in oily feeds. Corn is rich in both carbohydrates and fat.

Mineral Matter. Nutrients used principally to build the skeleton, hair, hoof, horn, and the like. Legume hays, bran, linseed meal, and skim milk have relatively large quantities of mineral matter.

Vitamins. Substances found in feeds in very small quantities which are necessary for growth, reproduction, and protection against diseases.

Crude Fiber. The coarse, woody parts of plants and one of the carbohydrates much less digestible than the others.

Ration. The quantity of feed given an animal during one day.

Balanced Ration. A ration which contains the proportion of nutrients proper to nourish the animal to which it is fed.

Pig Catcher



With this easily-made device you can take a pig away from the cross-sow in perfect safety. Take a piece of heavy wire about 4½ feet long. Shape it as though making a frame for a fishing dip net. Drive the shanks into a strong light handle about 6 feet long. Take the bottom half of a gunny sack and sew the open end around the hoop with a stout cord. With this device you can lean across the fence and scoop up the small pigs. The correct procedure is to put the sack down over the pig and give it a quick jerk which will throw him off his feet and land him in the sack. The pig will lie quietly in the sack until you take hold of him.

Loading Contrary Hogs

If you have trouble running hogs up a chute into a truck, try this plan. When they insist on reversing themselves at the foot of the chute, simply force a half-bushel basket over their heads. In their struggles to back out, the hogs will back all the way up the chute and into the truck.

Handling Stubborn Hog

A stubborn hog can be successfully loaded into a truck by placing a bushel basket over his head. The hog will back away, trying to get out of the basket, and can be backed wherever he should go.

Cost of One Pound of Feed at a Given Price and Weight per Bushel

Cost per bushel	Weight per bushel—pounds				
	32	48	56	60	70
cents	cents	cents	cents	cents	cents
30	0.937	0.625	0.536	0.500	0.429
31	0.969	0.646	0.554	0.517	0.443
32	1.000	0.667	0.571	0.533	0.457
33	1.031	0.687	0.589	0.550	0.471
34	1.062	0.708	0.607	0.567	0.486
35	1.094	0.729	0.625	0.583	0.500
36	1.125	0.750	0.643	0.600	0.514
37	1.156	0.771	0.661	0.617	0.529
38	1.187	0.792	0.679	0.633	0.543
39	1.219	0.812	0.696	0.650	0.557
40	1.250	0.833	0.714	0.667	0.571
41	1.281	0.854	0.732	0.683	0.586
42	1.312	0.875	0.750	0.700	0.600
43	1.344	0.896	0.768	0.717	0.614
44	1.375	0.917	0.786	0.733	0.629
45	1.406	0.937	0.804	0.750	0.643
46	1.437	0.958	0.821	0.767	0.657
47	1.469	0.979	0.839	0.783	0.671
48	1.500	1.000	0.857	0.800	0.686
49	1.531	1.021	0.875	0.817	0.700
50	1.562	1.042	0.893	0.833	0.714
51	1.594	1.062	0.911	0.850	0.729
52	1.625	1.083	0.929	0.867	0.743
53	1.656	1.104	0.946	0.883	0.757
54	1.687	1.125	0.964	0.900	0.771
55	1.719	1.146	0.982	0.917	0.786
56	1.750	1.167	1.000	0.933	0.800
57	1.781	1.187	1.018	0.950	0.814
58	1.812	1.208	1.036	0.967	0.829
59	1.844	1.229	1.054	0.983	0.843
60	1.875	1.250	1.071	1.000	0.857
61	1.906	1.271	1.089	1.017	0.871
62	1.937	1.292	1.107	1.033	0.886
63	1.969	1.312	1.125	1.050	0.900
64	2.000	1.333	1.143	1.067	0.914
65	2.031	1.354	1.161	1.083	0.929
66	2.062	1.375	1.179	1.100	0.943
67	2.094	1.396	1.196	1.117	0.957
68	2.125	1.417	1.214	1.133	0.971
69	2.156	1.437	1.232	1.150	0.986
70	2.187	1.458	1.250	1.167	1.000
71	2.219	1.479	1.268	1.183	1.014
72	2.250	1.500	1.286	1.200	1.029
73	2.281	1.521	1.304	1.217	1.043
74	2.312	1.542	1.321	1.233	1.057
75	2.344	1.562	1.339	1.250	1.071
76	2.375	1.583	1.357	1.267	1.086
77	2.406	1.604	1.375	1.283	1.100
78	2.437	1.625	1.393	1.300	1.114
79	2.469	1.646	1.411	1.317	1.129
80	2.500	1.667	1.429	1.333	1.143
81	2.531	1.687	1.446	1.350	1.157
82	2.562	1.708	1.464	1.367	1.171
83	2.594	1.729	1.482	1.383	1.186
84	2.625	1.750	1.500	1.400	1.200
85	2.656	1.771	1.518	1.417	1.214
86	2.687	1.792	1.536	1.433	1.229
87	2.719	1.812	1.554	1.450	1.243
88	2.750	1.833	1.571	1.467	1.257
89	2.781	1.854	1.589	1.483	1.271
90	2.812	1.875	1.607	1.500	1.286
91	2.844	1.896	1.625	1.517	1.300
92	2.875	1.917	1.643	1.533	1.314
93	2.906	1.937	1.661	1.550	1.329
94	2.937	1.958	1.679	1.567	1.343
95	2.969	1.979	1.696	1.583	1.357
96	3.000	2.000	1.714	1.600	1.371
97	3.031	2.021	1.732	1.617	1.386
98	3.062	2.042	1.750	1.633	1.400
99	3.094	2.062	1.768	1.650	1.414
100	3.125	2.083	1.786	1.667	1.429

(From "Feeding the Dairy Herd" Minnesota Extension Bulletin 218.)

Age at Which to Breed

Holstein and Ayrshire heifers should calve between 27 and 30 months of age.

Guernsey and Jersey heifers between 24 and 27 months of age.

Growth and development should be considered, as the under-developed heifer should be bred to calve later.

AVERAGE GESTATION PERIOD

	Weeks	or Days	Extremes (days)
Sow	16	112	109 to 120
Ewe	22	150	146 to 157
Cow	40½	283	240 to 311
Mare	48½	340	307 to 412

Estimating Weights of Heifers

This table gives the approximate weights and heart girth measurements of well grown heifers at different ages, and may be used for checking on the gains and growth of dairy females.

In measuring the heart girth draw the tape snugly around the animal just back of the shoulders. Have the animal standing in a normal position when the measurement is taken.

HOLSTEIN

Age—Months	Weight lbs.	Heart Girth inches
3	200	40
6	375	49
9	525	55
12	675	60
15	800	64
18	875	65.5
24	1100	72

GUERNSEY

Age—Months	Weight lbs.	Heart Girth inches
3	140	37
6	275	45
9	400	51
12	500	54
15	600	57.5
18	675	60
24	875	65.5

JERSEY

Age—Months	Weight lbs.	Heart Girth inches
3	125	35.5
6	250	44
9	375	50.5
12	475	55
15	550	58
18	620	61
24	775	66.5

(From "Raising Dairy Calves", University of Wisconsin Extension Service Circular 305.)

Keep Self-Feeder from Clogging

To keep the self-feeder from clogging, old chains can be fastened from the inside. As the hogs eat, they move the chains about, preventing clogging of the feed.

Gestation Table

Service Date	EXPECTED BIRTH DATE	
	Mare	Cow
Jan. 1	Dec. 7	Oct. 11
Jan. 11	Dec. 17	Oct. 21
Jan. 21	Dec. 27	Oct. 31
Jan. 31	Jan. 6	Nov. 10
Feb. 10	Jan. 16	Nov. 20
Feb. 20	Jan. 26	Nov. 30
Mar. 2	Feb. 5	Dec. 10
Mar. 12	Feb. 15	Dec. 20
Mar. 22	Feb. 25	Dec. 30
Apr. 1	Mar. 7	Jan. 9
Apr. 11	Mar. 17	Jan. 19
Apr. 21	Mar. 27	Jan. 29
May 1	Apr. 6	Feb. 8
May 11	Apr. 16	Feb. 18
May 21	Apr. 26	Feb. 28
May 31	May 6	Mar. 10
June 10	May 16	Mar. 20
June 20	May 26	Mar. 30
June 30	June 5	Apr. 9
July 10	June 15	Apr. 19
July 20	June 25	Apr. 29
July 30	July 5	May 9
Aug. 9	July 15	May 19
Aug. 19	July 25	May 29
Aug. 29	Aug. 4	June 8
Sept. 8	Aug. 14	June 18
Sept. 18	Aug. 24	June 28
Sept. 28	Sept. 3	July 8
Oct. 8	Sept. 13	July 18
Oct. 18	Sept. 23	July 28
Oct. 28	Oct. 3	Aug. 7
Nov. 7	Oct. 13	Aug. 17
Nov. 17	Oct. 23	Aug. 27
Nov. 27	Nov. 2	Sept. 6
Dec. 7	Nov. 12	Sept. 16
Dec. 17	Nov. 22	Sept. 26
Dec. 27	Dec. 2	Oct. 6

Service Date	EXPECTED BIRTH DATE	
	Ewe	Sow
Jan. 1	May 31	Apr. 25
Jan. 11	June 10	May 5
Jan. 21	June 20	May 15
Jan. 31	June 30	May 25
Feb. 10	July 10	June 4
Feb. 20	July 20	June 14
Mar. 2	July 30	June 24
Mar. 12	Aug. 9	July 4
Mar. 22	Aug. 19	July 14
Apr. 1	Aug. 29	July 24
Apr. 11	Sept. 8	Aug. 3
Apr. 21	Sept. 18	Aug. 13
May 1	Sept. 28	Aug. 23
May 11	Oct. 8	Sept. 2
May 21	Oct. 18	Sept. 12
May 31	Oct. 28	Sept. 22
June 10	Nov. 7	Oct. 2
June 20	Nov. 17	Sept. 12
June 30	Nov. 27	Sept. 22
July 10	Dec. 7	Nov. 1
July 20	Dec. 17	Nov. 11
July 30	Dec. 27	Nov. 21
Aug. 9	Jan. 6	Dec. 1
Aug. 19	Jan. 16	Dec. 11
Aug. 29	Jan. 26	Dec. 21
Sept. 8	Feb. 5	Dec. 31
Sept. 18	Feb. 15	Jan. 10
Sept. 28	Feb. 25	Jan. 20
Oct. 8	Mar. 7	Jan. 30
Oct. 18	Mar. 17	Feb. 9
Oct. 28	Mar. 27	Feb. 19
Nov. 7	Apr. 6	Mar. 1
Nov. 17	Apr. 16	Mar. 11
Nov. 27	Apr. 26	Mar. 21
Dec. 7	May 6	Mar. 31
Dec. 17	May 16	Apr. 10
Dec. 27	May 26	Apr. 20

Winter Grain Mixtures for Dairy Cows

Grain Mixtures For High Protein Roughages

(Such as alfalfa, soybean or clover hay, with or without silage.)

Total protein 13-15%—Digestible protein 10-12%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	400	200	...	500
Ground barley.....	...	...	200	400	...
Ground oats.....	400	200	400	400	300
Wheat bran.....	...	200	...	...	...
Cracked soybeans	100	100	100	100	100

Grain Mixtures For Mixed Hay

(Such as timothy and clover or a mixture of other high protein and low protein roughages, with or without silage.)

Total protein 17-20%—Digestible protein 14-16%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	200	200	...	500
Ground barley.....	...	200	200	400	...
Ground oats.....	400	200	400	200	300
Wheat bran.....	...	200	...	200	...
Cracked soybeans...	300	250	250	250	300

Grain Mixtures For Low Protein Roughages

(Such as timothy, sudan grass, oat hay, corn fodder, millet, etc., with or without silage.)

Total protein 21-21%—Digestible protein 16-18%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	400	200	...	500
Ground barley.....	...	...	200	400	...
Ground oats.....	400	200	...	200	300
Wheat bran.....	...	200	400	200	...
Cracked soybeans...	400	400	400	400	400

Substitutions

1. Corn and cobmeal can be replaced by an equal weight of ground corn or barley. Wheat can also be substituted for corn but should not make up more than one-third of the grain mixture.

2. Ground oats can be replaced by an equal weight of bran but due to the lower total digestible nutrients in bran it would be desirable to increase the percentage of corn in the grain ration.

3. Cracked soybeans can be replaced by an equal weight of linseed oil meal, soybean oil meal, cottonseed meal or gluten meal. Gluten meal differs from gluten feed in that it does not contain the corn bran. Gluten meal is about 12 to 15 percent higher in protein than gluten feed. About two-thirds of a pound of tankage will replace the protein in one pound of soybeans.

Select the grain mixture which fits the roughage; also consider the feeds on hand and the costs per ton of the mixtures.

From "Feeding Dairy Cows," Iowa Bulletin No. 177. (Revised)

Water Tank Guard Keeps Cattle Out

A simple guard made of gas pipe and placed above the water tank so that cattle must put their heads under it when drinking will keep them from getting into the tank. The guard can be made of ½-inch pipe and uprights which hold it at proper height can be flattened and drilled at the lower end so that they can be fastened to the tank with bolts or rivets.

14. Location of refrigerator near sink and away from stove.
15. Dishing-up counter space near stove.
16. Room for fuel box near stove if a wood-coal range. Range placed far enough away from wall to prevent fires.
17. Metal hood, equipped with exhaust fan over range will keep the kitchen much cleaner and much cooler in summer.
18. Pot and pan cupboard near stove.
19. Cupboard for cleaning equipment, such as brooms, mops, cleaners and buckets, as well as small supplies.
20. Floor covering and wall finishes which are easily cleaned.
21. Good lighting—both natural and artificial. More than one light fixture usually is needed. Bracket lights near stove and sink are helpful. Tubular lights under the upper cupboards are excellent for lighting work surfaces in dark corners.
22. Cupboards extending to ceilings eliminate extra cleaning and provide space for seldom used articles.
23. Dining area well lighted.
24. Plenty of electric outlets above work counter; at least one near eating table, and one correctly located for refrigerator. The use of an electric clock, radio and fan should be considered also.
25. Possibility of a business center in the kitchen should be studied.
26. Windows and doors screened. If kitchen has south or west windows, the use of awnings during summer months will lessen glare and keep kitchen more comfortable.

Planning comfortable, convenient kitchens is neither a difficult nor mysterious task. The most satisfactory results are obtained by sketching the plan of the entire house on squared paper such as high school students use and studying the complete layout. Remodeling possibilities can be seen and proposed changes in kitchen walls, doors, windows and chimneys weighed in relationship to the rest of the house.

Many American farm homes and farm kitchens will be remodeled now that the war is finished. You can make your plans now.

Makes Ironing Easier

Beeswax or paraffin, of course, makes the iron glide more smoothly. But too much is just as annoying as too little, and the wax should be handy to the ironing board so that the minute quan-

tity needed can be applied easily. Here is the way to always have the wax handy and apply just the right amount to the iron. In one end of the ironing board bore a few holes about one-half inch deep. Fill the holes with beeswax or paraffin and cover them with two thicknesses of muslin. Rubbing the hot iron over the muslin will bring up just enough wax to make the iron work smoothly.

Roll Lines Without Kinks

To coil clothesline, wire or rubber hose so that it will not kink or twist, try rolling towards you instead of from you.

Weights and Measures

Lard—2 cups make 1 pound
 Butter—2 cups make 1 pound
 Flour (Pastry or Bread)—4 cups make 1 pound
 Flour (Whole Wheat)—3-7/8 cups make 1 pound.
 Flour (Graham)—4 1/2 cups make 1 pound
 Flour (Rye)—4 1/8 cups make 1 pound
 Corn Meal—2-2/3 cups make 1 pound
 Rolled Oats—4 3/4 cups make 1 pound
 Oatmeal—2-2/3 cups make 1 pound
 Coffee—4-1/3 cups make 1 pound
 Sugar (Granulated)—2 cups make 1 pound
 Sugar (Powdered)—2-2/3 cups make 1 pound
 Sugar (Confectioner's) — 3 1/2 cups make 1 pound
 Sugar (Brown)—2-2/3 cups make 1 pound
 Meat (Chopped)—2 cups make 1 pound
 Rice—1-7/8 cups make 1 pound
 Raisins (Packed)—2 cups make 1 pound
 Currants—2 1/4 cups make 1 pound
 Bread Crumbs (Stale)—2 cups make 1 pound
 Eggs (Large)—9 make 1 pound
 Butter—2 tablespoonfuls make 1 ounce
 Flour—4 tablespoonfuls make 1 ounce
 Baking Powder—6 tablespoonfuls make 1 ounce
 Salt—1 tablespoonful makes 1 ounce
 3 teaspoonfuls make 1 tablespoonful
 16 tablespoonfuls dry ingredients make 1 cup
 4 teaspoonfuls (liquid) make 1 tablespoonful
 4 tablespoonfuls make 1 wineglass (or 1/2 gill)
 2 wineglasses make 1 gill.
 2 gills make 1 coffee cupful, or 16 tablespoonfuls
 2 coffee cupfuls make 1 pint
 2 pints make 1 quart

4 quarts make 1 gallon
 2 tablespoonfuls (liquid) make 1 ounce
 16 ounces make 1 pound—or 1 pint of liquid
 1 pint finely chopped meat, packed solidly, makes 1 pound
 4 coffee cupfuls sifted flour make 1 pound
 1 quart unsifted flour makes 1 pound
 1 pint sugar (white granulated) makes 1 pound
 1 tablespoonful soft butter, well rounded, makes 1 ounce
 An ordinary tumblerful equals 1 coffee cupful or 1/2 pint.
 About 25 drops thin liquid makes 1 common teaspoonful.

Short Cuts for Busy Homemakers

In Extension Circular 1187 — "Shortening the Work Hours"—the University of Nebraska Agricultural College Extension Service gives a number of ideas for more efficient house-keeping. Among them are the following:

When measuring a half cup of fat put a half cup of cold water in the cup first, then add fat until water reaches one cup mark.

When cutting marshmallows, butter the scissors used. It keeps the marshmallows from sticking together or sticking to the scissors.

Cleaning can be saved by basting the top of the trouser cuff on men's work and chore trousers. Then they will not catch and fill with dirt and chaff which is so often brought into the house.

For cleaning the top of a kitchen stove a blackboard eraser is useful. It is more satisfactory than a cloth and keeps the hands clean.

Use a paper plate underneath a paint can when painting. It provides a place for the brush and prevents paint from dripping on the floor.

An alarm clock placed in the kitchen window will call you from the garden or flower beds at just the right time. This will save many unnecessary steps to the house to see what time it is.

When cutting soap for washing clothes, try cutting it on a cabbage cutter. Flakes are uniform and as thin as tissue. Then pour boiling water over them and they will melt instantly.

If you will place a pin across the button and sew over it when you sew buttons on heavy cloth, a shank will be formed and the button will button easier and stay on longer.

Mashed potatoes may be kept hot while waiting by placing the kettle in a pan of boiling water or by putting the potatoes in the upper part of a double boiler.

Cover the fruit juice which has oozed from a pie in the oven with salt to prevent smoke.

Rinse with hot water the cup in which you are to measure lard or butter.

To clean paint from clothing, take equal parts of ammonia and turpentine, saturate the spot two or three times, then wash out in soap suds. This will remove the paint, no matter how dry or hard.

A bag of flannel large enough to fit over the broom is a handy article to clean ceilings and high walls. It can be removed and washed easily.

Removing Stains

Here are some effective methods of removing more common stains from clothing, hats, etc.

Grass Stain: Use hot water and soap and remove the stain by thorough rubbing. Or, apply grain or wood alcohol by sponging. This method is good for use on fabrics which might be injured by laundering.

Grease Stain: Scrape or wipe off as much of the grease as possible, then launder with a soap containing naphtha or kerosene. Carbon-tetrachloride, gasoline or naphtha, may be used. Carbon-tetrachloride is the safest as it is not inflammable. All others should be used in a cool shady place out of doors or before an open window away from all flames in the house. Place a pad of clean cloth or white blotter beneath the stain and change it as soon as it becomes soiled. Sponge the stain with a clean cloth, moistened with the solvent. To prevent the solvent and grease from spreading, it is best to use small amounts of the solvent at a time and work from the outside of the spot toward the center. After sponging, rub with a clean cloth until the spot is thoroughly dry.

Ice Cream Stain: Use ordinary laundering methods or sponge with lukewarm water and then use the solvents mentioned for grease.

Ink Stain: Soap and water will remove some types of school inks when rubbed thoroughly. If this does not prove satisfactory soak the stains in milk, a day or two if necessary. These methods are safe for use on all washable fabrics. If they fail you might try

moistening the stain with lemon juice and expose it to the sun.

Fruit and Wine Stains: Quickly cover the spot with salt if fruit juice or wine is spilled on the table cloth. The salt lessens the stain and boiling water poured through the stains will usually remove them entirely. If the boiling water fails, try a weak solution of oxalic acid.

Coffee and Tea Stains: Pour boiling water through the stains until they disappear.

Iron Rust Stains: Cover rust spots with salt wet with lemon juice and lay out in the sun.

Other suggested stain removers for rust spots are:

Salts of lemon and sunshine as described above.

Ripe tomato may remove the stains.

Soaking in milk may also prove effective.

If the material is white linen or cotton, try chlorinated soda.

Kerosene Spots: Spots left by kerosene spilled on books, rugs or furniture will sometimes disappear if the article is left in the bright sunlight all day. If this fails, hold spotted article as close to a hot fire as you can comfortably hold your hand.

Paint Stains: Turpentine will remove paint spots from fabrics, glass or iron.

Blood Stains: Wash with clear, cold water. If this fails, wet with kerosene and wash in warm suds.

Mildew: Here are several suggestions for removing mildew:

Try lemon, salt and sun as suggested for iron rust.

Use diluted oxalic acid.

Rub the stains with molasses and then thoroughly wash the fabric.

If the material is white, try boiling it in buttermilk.

Cleaning Silver

If your silverware is not deeply tarnished and you want to avoid the unpleasant task of polishing it in the usual way, allow it to stand one hour in potato water. When it is removed and dried it shines like new.

Removing Glassware Stains

Glass dishes which have been badly stained by letting hard water stand in them may be cleaned by this method. Fill with sour milk and let stand for twenty-four hours. Then wash out the dish in the regular way.

Cleaning and Polishing Metals

Here are some helpful ideas for cleaning and polishing:

Silver: The easiest way to keep silver polished is to use it. If silver must be stored, it is best to keep it in a cool, dry place, either in dark-colored outing flannel cases, in a drawer lined with black paper or in a glass jar with camphor gum. The gum must not touch the silver.

Tarnished silver may be polished with a paste made of 3 parts of the finest whiting to 1 part of alcohol or ammonia. Apply this with a soft cloth, allow it to dry, then polish with another soft cloth. Wash in suds, rinse and dry.

Copper, Brass and Pewter: These are beautiful with the soft, dull finish that comes with age; but sometimes a bright finish is desired. To get it, make a cream of fine whiting and alcohol, apply this with a soft cloth and allow it to dry. Wash and rinse. Dry. Vinegar or salt may be used on brass and copper to give a bright metallic finish. It should be washed off thoroughly.

A dull finish may be given to metal by using a paste of rotten-stone and linseed oil. After applying it with a soft cloth, wash, rinse and dry.

(New York State College)

Removing Grease Spots From Rugs

If allowed to remain for any length of time, grease spots are usually difficult to remove from rugs and carpets. Remove such spots promptly, using a grease solvent, such as carbon tetrachloride. Use the solvent on an inconspicuous part of the rug before attempting to remove the spot so that you can be sure it does not affect the color. Then work from the outside of the stain in toward the center, and repeat as necessary.

Candle wax spots can often be removed by first scraping off as much wax as possible with a dull knife, being careful not to injure the yarns. Then sponge with a grease solvent. If the candle was colored and a stain remains, try sponging lightly with a liquid made up of two parts of water and one part of denatured alcohol. As a precaution against fading, test first on an inconspicuous part of the rug.

Grease Remover

A cloth dampened with vinegar will do wonders in wiping down a stove top which has become splashed with dancing grease from the skillet. The vinegar cuts through the grease like magic.

Removing Oil From Wool

To remove oil and grease stains from wool rugs and garments all you need is a blotter and a warm iron. Place the blotter over the grease spot and set the warm iron on top of the blotter. The heat will draw the oil or grease up into the blotter. Repeat the operation several times using a clean portion of the blotter each time.

Another method that has been used successfully, particularly in the case of road oil tracked in upon a rug, is to spread cornstarch over the spots and allow it to remain for an hour. The cornstarch will soak up the oil and when it is swept off the spots will have gone from the rug.

Cleaning Soot From Rugs

Soot from the fireplace or stove which has fallen on the rug calls for special treatment. Instead of sweeping or brushing, which tends to imbed the soil in the material, sprinkle the spot with cornmeal. Let it remain on the carpet for a few minutes, then brush it out. Repeat this treatment until the cornmeal brushes out clean.

Lipstick Stains

Because most lipsticks are colored with vegetable dyes, their stains will wash out with soap and water. Some others are a bit more stubborn. Such stains can be removed from colored fabrics by first rubbing the stain with cold cream and then removing with Carbona. On white fabrics use Carbona first, then hydrosulphite, which may be purchased at the drug store.

China Stains

Borax will clean burned marks from stained china. Let the china stand in a solution of borax and water for a day, then wash with water.

Added Paper Use

Don't throw away that wax paper that your bread comes wrapped in. It will do a slick job of polishing the nickel on your stove. It is also good for the teakettle.

Put Rubber Cap on Broom Handle

A rubber cap of the kind used on the end of crutches will prevent your broom from sliding and falling down when leaned against a wall or door. Then, too, it will not mar wall paper, varnished or painted woodwork or anything else with which it comes in contact. Such a cap can be obtained at most any drug store.

Removing Grease From Wall Paper

Unsightly grease spots frequently can be removed by placing a piece of blotting paper over the spot and holding a warm iron against it. Be careful not to have the iron too hot. Dry bran rubbed on spotted wall paper is often effective in removing dirt and grease.

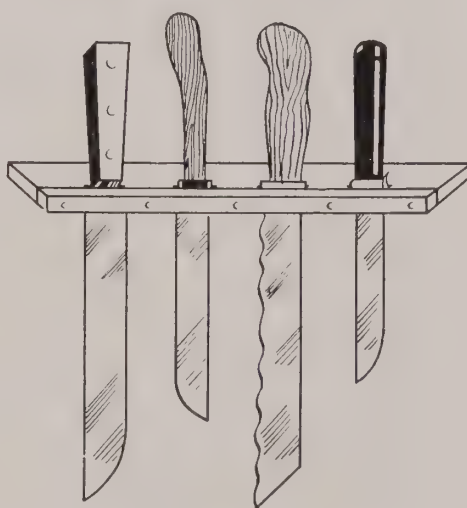
Dutch Oven Trouble

Occasionally you may find black specks in the food you have cooked in your Dutch oven. It isn't your fault, the oven was not properly tempered when made. You can overcome the difficulty by filling the oven full of water and soap flakes and boiling. If the specks still persist, try greasing the flaking oven with olive oil or suet and then really heat the whole works.

Removing Lime From Teakettle

If you are using hard water that causes lime to collect on the inside of your teakettle, try this simple method of removing it. Pour in two cupfuls of vinegar, fill with water and bring the mixture to a boil. After boiling a few minutes, remove the kettle from the fire and let it stand overnight. The lime will be taken up by the water which can be poured out. If the lime deposit is very heavy, it may be necessary to repeat the process one or more times.

Prevents Cut Fingers



Searching through a drawer full of sharp knives looking for the one you want is risky business. A handy knife rack such as illustrated will be a safety measure and a time saver. The back board is notched to fit various size knives and then a thin front strip is attached with screws. The whole can be mounted on the wall with brackets. Any handy man will be able to make you one that will just fit your needs.

Making Paraffin Jelly Tops Easy to Remove

You don't have to dig paraffin tops off your jellies and jams with a knife and run the risk of getting broken pieces mixed up with the spread. Next time you are putting up spreads, try this idea. Pour a thin layer of paraffin over the spread and let it harden. Then lay a piece of string across this cover so that the ends hang over opposite sides of the glass and pour on another layer of paraffin. To remove the paraffin, simply grasp each end of the string and pull upward.

Stops Corroding of Shaker Tops

Metal tops on salt shakers often corrode because of the salt. This can be stopped by covering the inside of the shaker top with melted paraffin. Before the paraffin has set, open the holes by punching them out with a pin or toothpick.

Refrigerator Tips

A piece of charcoal placed in the refrigerator will absorb food odors like Junior absorbs the food. An electric fan played on the freezing unit will hasten the defrosting operation. Hot water in the ice trays will do the same job.

Knife Protection

After you peel the onions, you have a knife that reeks. Plunging the offending blade into a raw potato will take away the onion smell.

Save the Saucepan

Burned enamel saucepans can often be reclaimed by filling the pan with salt water and allowing it to soak for two hours. Then bring the solution to a boil. Empty and use a moderate bit of rubbing and, presto, the burn is gone.

Keeping the Refrigerator Odorless

Many foods such as onions, fish, cucumbers and melons give off odors which contaminate other foods stored in the refrigerator. This contamination can be largely avoided and the refrigerator will remain sweet and clean if you will place a two-inch square of charcoal or a jelly glass of charcoal sticks in the corner of the food chamber.

Dry Clean Lard Buckets

Before washing lard buckets that are wanted for another use warm the bucket and rub with corn meal or bran. The bucket will then wash more easily.

Sandpaper Helps Tighten and Loosen Jar Lids

Use a piece of sandpaper to grasp screw-on lids of fruit jars when tightening or loosening them. It will give you a firm grip on the lid and enable you to turn it quickly and with less effort.

Sour to Sweet

Sometimes in spite of the best of care, thermos bottles will turn sour. They can be made sweet again by soaking overnight with a teaspoonful of soap added to the water contents in the bottle.

No Stick—No Mess

You can overcome the discouragement which comes with the pan in which you have burned the sweet potatoes. You won't have charred bits sticking to the bottom if you will put in a piece of shortening the size of a walnut while cooking the sweets.

Flame Color is Key to Efficiency

Flame color is one indication of how efficiently a kerosene stove is operating. Yellow flame is a sign of inefficiency and should not be allowed for any length of time. A blue flame is a sign of efficient operation and may be obtained by trimming wick and proper adjustment of air.

Scouring Cutlery and Pans

To scour knives and other cutlery use a cork dipped in scouring powder. This method can also be used for scouring pans.

Marble in Teakettle Stops Liming

The nuisance of lime deposits on the inside of your teakettle can be overcome by keeping a marble in it. The marble will collect the lime and prevent the deposits.

Funnel Separates Eggs

A speck of yolk left in the white of an egg will prevent the white from whipping stiff. If you have trouble separating the yolk and white in the usual way try breaking the egg into a funnel. The white will run through while the yolk remains behind in the funnel.

Measuring Tip

When you are cooking something that calls for two cups of butter, (if you can find any), don't bother to measure. Just drop in the whole pound, for a pound measures just two cups.

Salt Conditioners

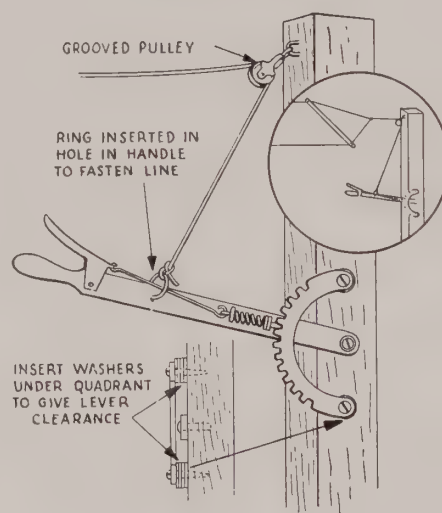
If your salt sticks during damp weather, a teaspoon of cornstarch thoroughly mixed with each cup of salt will recondition it to a free-flowing state.

To keep salt from caking in salt shakers, add several grains of rice. Every time the salt shaker is shaken the rice will break up any tendency of the salt to start caking.

Substitute Egg

If you have misplaced your darning egg and hubby's socks get too ventilated, an old radio tube will do a good job as a substitute egg.

Clothesline Tightener



If you have a handy man around the house, he can easily make this effective, easily operated clothesline tightener out of a pulley and an old automobile or truck emergency brake lever and quadrant or similar parts of a discarded farm implement. Bolt the lever to the post (or side of a building) and fasten the quadrant in place with long screws, using washers to provide clearance for the lever. Drill a hole in the lever handle and insert a ring to which the line can be fastened. The line can be made slack for hanging up clothes by raising the lever and stretched up tight after the clothes have been hung by pulling down on the lever.

This same device can be used for tightening two lines if an eveners is provided as shown in the circle.

Keep Cake Fresh

Here are two good ways to keep a cut cake fresher. Cut the cake in half and slice from either side. After dessert, just slide the remaining two sides together. Then there is the old standby of putting a piece of bread against the cut surface and holding it there with toothpicks. Either method helps retain moisture.

No Fold Up

You can stop your whipped cream from going limp by the simple addition of a little granulated gelatin. Soak the gelatin in one tablespoon of cold milk and then dissolve in hot water. When it is nice and cool add to the cream drop by drop while you continue beating.

Pick the Right Time

Practically every cook, amateur and professional, knows that mashed potatoes are improved with the addition of milk. But most people add the milk at the wrong time. It should be added to the water in which the potatoes are cooking just before you are ready to mash. Then save the liquid for soup stock.

Sound Test

Here is a test to use on watermelons. Put your ear close to the melon, thump it lightly with your finger and listen closely. If the melon sez "pink" it is green. If it sez "punk" it is just ripe enough to get in your ears.

Tomato Care

The minute you get tomatoes in the house, put them in hot water for a minute or so. This will do double duty. It will make the skins come off easier, but even better, it will make the tomatoes keep better. Don't ask us why.

Carrying Meringue Pie Safely

If you are going to carry a meringue pie down to the school house or church, take this precaution: Place five or six toothpicks in and around the center of the pie before covering it with waxed paper. They will keep the paper away from the meringue.

Storing Lemons

Lemons that are to be stored for some time will keep better if they are coated lightly with melted paraffin. The paraffin can be applied best with a small brush. When they are to be used, the paraffin can be removed by heating slightly. The paraffin will then roll off or can be wiped off.

About the Lemon

The lowly lemon is really a good friend to all homemakers. The juice improves the taste of most fruit-flavored gelatines. Lemon juice adds zest to ices, sherbets and fruit drinks. Even the rind lends a fine flavor to beverages. Don't throw away the used cut lemon. Keep it at the kitchen sink to be used for your hands after washing the dishes.

A Jumble of Wisdom

It is better to buy lemons in quantity. Don't worry about them drying out. Keep them in water. Change the water once a week . . . A slice of bread in the kettle in which you cook cabbage, cauliflower or sprouts will cut down the odor somewhat . . . Sprinkle your clothes with hot water and they will be ready to iron within 15 minutes. Hot water penetrates much faster than cold . . . You can clean the cork mats you use on the table by rubbing them with sandpaper wrapped around a small block of wood . . . Melted alum will mend broken glasses without showing the crack . . . Boil beets and they peel easily. You can do the same thing with carrots after they are cooked . . . Beat eggs lightly when you intend using them as a thickening agent in custards and the like, but beat the dickens out of them when you are looking for fluffiness for angel food cakes, omelets, etc. . . . A handy gadget for using granulated soaps economically is a 10 cent sugar shaker. It is grand when washing dishes, pots and pans . . . That new cake tin won't burn cakes if you butter the tin and place it in a moderate oven for 15 minutes . . . If you are going to heat milk in a saucepan, rinse the pan first with water and the milk won't stick . . . A few drops of kerosene and a bit of borax will make your window washing much simpler . . . To cut fresh bread, heat the blade of the knife in hot water; it prevents breaking and crumbling. The same treatment works on fudge or caramel candy . . . If the candles on your table look a bit soiled wipe them off with a cloth dampened in alcohol . . . Keep wooden ware away from the stove. The sudden drying on the outside will cause it to warp and even crack . . . Add a well beaten white of egg to mashed potatoes and then beat them together. They will look and taste much better . . . Soft soap laid over hard putty will soften the putty in a few hours so that you can remove the window pane easier . . . and finally, the addition of snails to that fish aquarium of yours will cut to the minimum that greenish deposit you have been noticing. Snails are excellent scavengers.

Table Stretcher

Next time you are confronted with the problem of a too-small tea table, use a cloth covered comp board that is a few inches bigger than the table. All of your guests will be grateful for the added space.

Lamb Secret

If the family doesn't like too strong a flavor of lamb, just cut two or three deep gashes in the leg and pour in some vinegar, then one-third teaspoon of sugar, and after salting and peppering, cut a tomato for the top. It helps make a grand gravy, too.

Meat Stretcher

There is nothing quite so discouraging as watching sausages shrink up to about half the size you anticipated. You can get around this nuisance by boiling the sausages for five minutes before you fry them. You will get more for your money.

Cook It Dry

It seems somewhat paradoxical, but adding water to meat roasts tends to make the meat dry. Even occasional basting isn't good, unless the meat is extra lean. Meat packers recommend that you cook your roasts without water.

Another "V"

Whisk broom trimmed into a sharp V point makes a perfect reacher for those elusive couch corners, or even floor corners.

Conceal Furniture Scratches

Small scratches on furniture often disappear when rubbed with nut meats. The oil in the nut darkens and conceals the scratch.

To Make Casters Stay in Furniture

If you are troubled by a loose caster that keeps falling out of some piece of furniture every time it is moved, try this. Remove the caster and pour melted paraffin in the hole. While the paraffin is still warm push the caster back into place. Allow it to set firmly before setting the piece of furniture upright again.

White Spots Away

Those white spots on mahogany furniture will respond nicely to this treatment. Smear a thick coating of vaseline over the spots. Let it stand for a couple of days and when you wipe off the vaseline you'll discover that the spots will come off with the grease.

Separate Lettuce

It is really exasperating to try and carefully separate lettuce leaves from a head, only to have them crumble and tear in your hands. You can get around this headache if you will just hold the tightly impacted head under a strong stream of cold water. The force of the water will separate the leaves nicely.

Prevent Picture Marks on Walls

Pictures hanging on walls for any length of time leave unsightly marks which are often difficult to remove or hide. Such marks can be prevented, however, if rubber headed tacks are driven into the back of the frame, one on each side at the bottom. The tacks will hold the picture away from the wall and prevent marking.

To Clean Furniture

You are in for a pleasant surprise the next time you clean furniture if you will saturate a cloth with weak tea and rub the furniture briskly and then rub dry with a soft cloth. Much more effective than plain water.

Scratch Eraser

Scratches on walnut furniture may be made invisible with iodine. While you are using this method you will no doubt get some of the stain on your fingers. Mix a tablespoon of lemon juice in a cup of hot water and the solution will remove the stains.

Good Duster

Take a piece of old flannel and dip it in paraffin oil. Allow to soak thoroughly for several hours. Then wring it out and wash it in lukewarm water before drying. Result: a grand home-made dust cloth which will help to polish your furniture while it picks up the dust.

Stop Rugs From Slipping

Small scatter rugs on polished floors can be very dangerous to life and limb because they slip so easily. This condition can be corrected by sewing old jar rubbers to the underside corners of the rug.

A Whiter 88

Those piano keys which have yellowed can cause a lot of embarrassment. But they can be made white again quite easily. Dip a piece of muslin in alcohol and give them a once over. If they don't respond to just alcohol, try flannel moistened with cologne water. And as a last resort, use fine powdered French chalk mixed with benzine.

Piano Scratches

Of course none of your own brood would think of it, but that ill-mannered neighbor child may kick up a ruckus in your house and in so doing leave a lovely scratch on the piano leg. Don't fret. Just rub butter over the wound and the mahogany color will come back like magic.

Moisture Helps Corn to Pop

Popcorn loses its popping power if it becomes too dry. The steam that forms from moisture inside the kernel causes the popping. If corn does not pop well, put a tablespoon or two of water in a glass jar, fill the jar with corn, shake well, and let it stand a week or so.

For Wicker Furniture

Next time you have to scrub that wicker furniture of yours, do the job with salt water. The salt not only cleans but stiffens the wood into a semblance of newness again.

It'll Really Shine

Equal parts of lemon juice and turpentine will bring out a high polish on your furniture. Wipe off the excess oil and then rub hard with a nice clean woolen cloth.

Making Rag Rugs Last Longer

When you shake your rag rugs, always remember to hold them by the sides. When held by the ends, the weight of the rug has a tendency to pull the threads apart.

Use Ammonia Water

Never clean matting with soap. Ammonia and cold water is the proper combination. The results are much better and the matting dries in much less time.

Removing Match Scratches on Paint

Try rubbing match scratches on painted wood with a piece of lemon. After the scratches have been removed, rub the surface with vaseline. This will make it practically impossible to scratch matches on the spot again.

For White Marble

White marble articles can be made spic and span by putting a little borax in a saucer. Then wrap a cut lemon in a cloth. Dip the cloth-wrapped lemon into some tepid water, then into the borax. Then rub the marble.

Gum Remover

Gum, which has been carelessly dropped on the carpet or upholstery, can be removed usually if you will just rub the gum with a piece of ice. Be patient, as it sometimes takes quite a bit of rubbing.

Cleans Milk Strainer Screens

It has been found that steel wool is very effective in cleaning milk strainer screens.

Keep Glass Clean When Painting

When painting window frames it is sometimes difficult to keep the paint from getting on the window glass. If, before starting to paint, the glass is rubbed lightly with petroleum jelly, paint can be easily removed where it has smeared on the glass. Be careful not to get any of the petroleum jelly on the surface to be painted.

Dry Removal of Paint

Here is a formula for a paint remover that is worked after it has dried. The advantages of such a procedure are obvious.

To mix the remover take five parts waterglass and add one part of soda lye and one part of ammonia. Apply the remover to the surface from which paint or varnish is to be removed, using an old brush as the lye may injure the bristles. When the remover has dried, the paint or varnish may be rubbed off. Should some stick, make another application and repeat the operation. With such an easy procedure there is no excuse for wasting materials by applying paint or varnish over old checked or peeling paint.

Using Staircases While Painting Them

A staircase coated with fresh paint is out of use unless a narrow track is left unpainted at one side or in the center, to be covered later when the rest of the paint is dry. But when a surface has been coated piecemeal in this fashion, it has an uneven look. A better method is to paint every other step, using the unpainted ones for ascending the staircase, and coating them later when the painted ones are dry. As each step is painted also paint the riser belonging to the next step. In this way the fresh paint will not be injured if a riser is accidentally kicked in using the stairway.

Exterminating Moles

If you are troubled with moles in the lawn, try this remedy. Push down into the runner with a stick or peg and pour about a teaspoon of arsenate of lead or paris green into the hole. Cover up the hole with a clod of earth to shut out the light. Do this in several places and the moles will usually disappear. This method is said to be more effective in dry weather.

Paint Stickiness

If newly dried paint still remains sticky, wash with plain cold water. It does the trick every time.

Paint Remover

A home remedy for paint spots can be prepared in the kitchen. To two cooking spoons of starch and one quart of water add two spoons of lye, that is, potash of lye. Use this mixture cold, rubbing it on with the mop. Rinse the wood with water, then with vinegar. Be careful of that lye, 'cause it burns.

Pick Up Glass Slivers

When glass shatters there are frequently a lot of very fine slivers that are very difficult to pick up without danger of getting them into your fingers and, of course, there is always the danger to youngsters if all these small slivers are not collected. The slivers can be safely picked up with a moist piece of absorbent cotton.

Keep Laundry From Freezing to Line

In cold weather laundry hung outside may freeze to the line and clothespins. This can be overcome by boiling the clothesline and clothespins in salt water for about a half-hour.

Mothball Smell Drives Away Mice

Mothballs or flake naphthalene offer protection against both mice and clothes moths, but for different reasons. Mice dislike the smell of the flakes, while moths die from the fumes. In the fall, when mice from outdoors come into cellars and attics, flakes scattered over and around stored mattresses, upholstered furniture, clothes, books and bags of seed are good and cheap insurance against mice.

Don't Roll 'Em

If you are warring on rats, and who isn't, be sure to never roll up your carpets when you are storing them. The rats can't do nearly as much damage if the rugs are left flat.

Moth-Killer

An effective way to get moths out of carpets is to take the carpets out in the open yard and soak them with bensoline. Be sure there are no open flames in the neighborhood.

Zipper Pillows

Save the zippers from old work shirts and dresses and sew them into the ends of pillows. When the ticking becomes soiled it's a simple matter to open the end and shake the feathers out into clean flour sacks to be hung in the sun to air while the tickings are being washed.

Get Longer Life From Linens

Table linens will last longer if the following precautions are taken:

1. Be careful in laundering. Avoid hard rubbing and scrubbing and keep them white by hanging in the sun rather than by using strong bleaches. Washing soda or strong alkali solutions in very hot water tend to injure linen as well as cotton and rayon.

2. When ironing table linens, try to have as few folds as possible and fold them in by hand instead of using the iron. If a center crease is necessary, change the fold with each ironing in order to prevent undue wear.

3. Napkins and tablecloths don't need starch. Linen fabrics may crack if starched too stiffly or if they are allowed to freeze while drying.

4. When good napkins and tablecloths develop holes, repair them with yarn from the fabric. If patching is needed, cut a piece from an old cloth of a similar pattern and work a monogram over the patch.

5. When linens are to be stored for a period of time, they will keep best in a well-ventilated closet where it is cool, dry and dark. Be sure they are clean but do not iron before storing. Wrap both linens and cottons in tissue paper or old sheeting.

Adhesive Tape Saves Sheets

Here are two new uses for adhesive tape, that multi-purpose household necessity. Pasted around the corners of bed springs and wherever there are sharp projections it will prevent the sheets from getting caught and torn.

Pieces of adhesive tape pasted on the bottoms of baby's shoes will help keep him from slipping while he is learning to walk.

Oilcloth Mending Trick

Your ever-handy, ever-useful roll of adhesive tape will come to the rescue to mend oilcloth that has been accidentally cut or torn. By putting a piece of adhesive tape over the cut on the wrong side and pressing the edges of the cut tightly against it you can prevent the cut from becoming an unsightly hole.

Shoe Brush

When the small-fry decide to make mud pies, you can be prepared for their homecoming if you will nail an old scrubbing brush upside down on the stoop. Of course, you may have to stand there 24 hours to remind the youngsters to use it.

Skirt Marker

The man who built your house built in a good skirt marker and probably forgot to tell you about it. But next time you are trying to make the hem of your skirt hang straight, just rub a little chalk on the edge of a window sill which hits you just about hip high. Do a turn around, allowing the chalk to mark the skirt. Then all you have to do is measure down from the chalk mark and the skirt will be just right.

Sandpaper Restores Suede Appearance

Suede shoes need regular brushing with a rubber sponge to preserve their appearance. When suede wears smooth, a few light strokes with the finest sandpaper will bring back its roughened surface. On the other hand, glossy leathers clean best with saddle soap, after which polish further softens the leather and improves appearance.

Remove Lettering From Sacks

Cloth flour sack material can be put to many uses if the printing is removed. This can be done by dipping the sacks in kerosene oil, washing thoroughly in cold water and then boiling.

Gauge Number Indicates Hose Quality

When purchasing hose, it's a good idea to check the gauge number. This indicates the number of wales in the stocking, or the number of stitches cast onto the needle bar. The more stitches there are, the more elasticity a stocking should have. Some gauge numbers, for example, are 39, 42, 45, 48, 51 and so on. These figures indicate the number of stitches in 1½ inches on the needle bar. Thus, a 51 gauge hose would have 12 more stitches in every 1½ inch than the 39 gauge, and would be more elastic.

Washing Chenille Successfully

Cotton chenille bedspreads (usually marked washable when purchased) can be laundered at home successfully. Tub the spread in warm, sudsy water, rinse it in warm water, and hang it up to dry—outdoors if possible. When it is almost dry, shake it well. This is much easier to do if there is someone to hold the other end of the spread and help keep it off the ground. To fluff up the chenille, hang the spread over a line or lay it on a table and rub the chenille briskly with the palms of the hands to raise the nap. Brushing with a whisk broom will also help to make the nap soft and fluffy.

To Kill Dandelions

Grubbing dandelions out of the lawn is a slow, tedious task. A much easier and quicker method of ridding your lawn of the pests is to squirt a little gasoline from a long spout oil can into the heart of each plant. This treatment does not injure surrounding grass and can be repeated to kill any plants which were missed the first time.

Restoring Color to Fabrics

Color taken out by an acid can usually be restored with an alkali. Color taken out by an alkali can generally be restored by an acid.

Fireproof Decorating Cotton

Absorbent cotton batting used as snow in Christmas decorations can be fireproofed by sprinkling it with a solution of the following mixture: 1¾ ounces borax, ¾ ounces boric acid, dissolved in 1 pint of hot water. After treating the cotton, do not handle until it is thoroughly dry, for to do so will remove its fluffiness. This fireproofing mixture is the same as that often used in fireproofing clothing.

Fireproof Christmas Trees

Christmas trees can be treated with a home-prepared fireproofing solution that also aids in holding the needles for a longer time. The tree should be treated as soon as you bring it home, if best results are desired. To do this, make a solution of ammonium sulfate — 1 pound of ammonium sulfate to 1½ pints of water in a crock or galvanized pail. Use an amount of ammonium sulfate equal to one-fourth the weight of the tree. Cut off the dried butt end and stand the tree in this solution. This cut should be made at fairly cool temperatures—55 to 65 degrees give best results. If ammonium sulfate is not available, calcium chloride can be used.

Cleaning Sooty Chimneys

If the chimney gets sooty inside it usually can be cleaned by throwing the zinc from several old jar tops into a very hot fire. If jar tops are not available, an old dry cell chopped up or a couple of flashlight batteries will serve the purpose. There are also a number of commercial preparations for the purpose.

If the building has a shingle or other combustible roof, this cleaning operation should be undertaken only when the roof is wet or heavily covered with snow as there is danger of setting it afire.

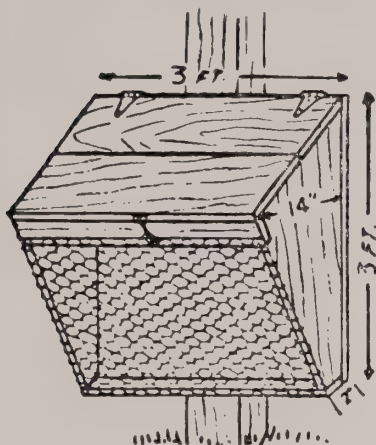
Quantity of Seeds and Number of Plants Required for 100 Feet of Row, Depths of Planting, and Distances Apart for Rows and Plants

Crop	Required for 100 feet of row		Depth for planting seed	Distance apart				
	Seed	Plants		Rows		Plants in the row		
				Horse cultivation	Hand Cultivation			
			Inches	Feet				
Asparagus.....	1 ounce.....	75	1	-1½	4	-5	1½ to 2 feet.....	18 inches
Beans—Lima, bush.....	1 pint.....		1	-1½	2½-3		2 feet.....	3 to 4 inches
Lima, pole.....	do.....		1	-1½	3	-4	3 feet.....	3 to 4 feet
Snap, bush.....	do.....		1	-1½	2½-3		2 feet.....	3 to 4 inches
Snap, pole.....	½ pint.....		1	-1½	3	-4	do.....	3 feet
Beet.....	2 ounces.....		1		2	-2½	14 to 16 inches.....	2 to 3 inches
Broccoli—Heading.....	1 packet.....	50- 75	½		2½-3		2 to 2½ feet.....	14 to 24 inches
Sprouting.....	do.....	50- 75	½		2½-3		do.....	do.
Brussels sprouts.....	do.....	50- 75	½		2½-3		do.....	do.
Cabbage.....	do.....	50- 75	½		2½-3		do.....	do.
Cabbage, Chinese.....	do.....		½	2	-2½		18 to 24 inches.....	8 to 12 inches
Cardoon.....	do.....	35	½		3		3 feet.....	3 feet
Carrot.....	do.....		½	2	-2½		14 to 16 inches.....	2 to 3 inches
Cauliflower.....	do.....	50- 75	½		2½-3		2 to 2½ feet.....	14 to 24 inches
Celeriac.....	do.....	200-250	⅛		2½-3		18 to 24 inches.....	4 to 6 inches
Celery.....	do.....	200-250	⅛		2½-3		do.....	do.
Chard.....	2 ounces.....		1	2	-2½		do.....	6 inches
Chervil.....	1 packet.....		½	2	-2½		14 to 16 inches.....	2 to 3 inches
Chicory, witloof.....	do.....		½	2	-2½		18 to 24 inches.....	6 to 8 inches
Chives.....	do.....		½		2½-3		14 to 16 inches.....	In clusters
Collards.....	do.....		½	3	-3½		18 to 24 inches.....	18 to 24 inches
Corn salad.....	do.....		½		2½-3		14 to 16 inches.....	1 foot
Corn, sweet.....	¼ pint.....		2	3	-3½		2 to 3 feet.....	Drills, 14 to 16 inches; hills, 2½ to 3 feet
Cress—Upland.....	1 packet.....		⅛- ¼	2	-2½		14 to 16 inches.....	2 to 3 inches
Water.....	do.....		⅛- ¼	2	-2½		18 to 24 inches.....	4 to 6 inches
Cucumber.....	do.....		1	6	-7		6 to 7 feet.....	Drills, 3 ft.; hills, 6 ft.
Dandelion.....	do.....		½		2½-3		14 to 16 inches.....	8 to 12 inches
Dasheen.....	½ peck.....	50	2	-3	3½-4		3½ to 4 feet.....	2 feet
Eggplant.....	1 packet.....	50	½		3		2 to 2½ feet.....	3 feet
Endive.....	do.....		½		2½-3		18 to 24 inches.....	12 inches
Florence fennel.....	do.....		½		2½-3		do.....	4 to 6 inches
Garlic.....	1 pound.....		1	-2	2½-3		14 to 16 inches.....	2 to 3 inches
Horseradish.....	Cuttings.....	50- 75	2		3	-4	2 to 2½ feet.....	18 to 24 inches
Jerusalem artichoke.....	1 to 2 quarts.....	25- 35	2	-3	3	-4	2 to 3 feet.....	2 to 3 feet
Kale.....	1 packet.....		½		2½-3		18 to 24 inches.....	12 to 15 inches
Kohlrabi.....	do.....		½		2½-3		14 to 16 inches.....	5 to 6 inches
Leek.....	do.....		½-1		2½-3		do.....	2 to 3 inches
Lettuce.....	do.....	100	½		2½-3		do.....	15 inches
Martynia.....	do.....		1	3	-4		2½ to 3 feet.....	2 feet
Muskmelon.....	do.....		1	6	-7		6 to 7 feet.....	Hills, 6 feet
Mustard.....	do.....		½		2½-3		14 to 16 inches.....	12 inches
Okra.....	2 ounces.....		1	-1½	3	-3½	3 to 3½ feet.....	2 feet
Onion—Plants.....		400	1	-2	2	-2½	14 to 16 inches.....	2 to 3 inches
Seed.....	1 packet.....		½-1	2	-2½		do.....	do.
Sets.....	1 quart.....		1	-2	2	-2½	do.....	do.
Parsley.....	1 packet.....		⅛	2	-2½		do.....	4 to 6 inches
Parsley, turnip-rooted.....	do.....		⅛- ¼	2	-2½		do.....	2 to 3 inches
Parsnip.....	do.....		½	2	-2½		18 to 24 inches.....	do.
Peas.....	1 pint.....		2	-3	2	-4	1½ to 3 feet.....	1 inch
Peppers.....	1 packet.....	50- 70	½		3	-4	2 to 3 feet.....	18 to 24 inches
Physalis.....	do.....		½	2	-2½		1½ to 2 feet.....	12 to 18 inches
Poke.....	do.....	25- 40	½-1	3	-3½		3 to 3½ feet.....	3 feet
Potato.....	5 to 6 pounds.....		4		2½-3		2 to 2½ feet.....	10 to 18 inches
Pumpkin.....	1 ounce.....		1	-2	5	-8	5 to 8 feet.....	3 to 4 feet
Radish.....	1 ounce.....		½	2	-2½		14 to 16 inches.....	1 inch
Rhubarb.....		25- 35			3	-4	3 to 4 feet.....	3 to 4 feet
Salsify.....	1 ounce.....		½	2	-2½		18 to 24 inches.....	2 to 3 inches
Shallots.....	1 pound (cloves).....		1	-2	2	-2½	14 to 16 inches.....	do.
Sorrel.....	1 packet.....		½	2	-2½		18 to 24 inches.....	5 to 8 inches
Spinach.....	1 ounce.....		½	2	-2½		14 to 16 inches.....	3 to 4 inches
Spinach, New Zealand.....	do.....		1	-1½	3	-3½	3 feet.....	18 inches
Squash—Bush.....	½ ounce.....		1	-2	4	-5	4 to 5 feet.....	Drills, 15-18"; hills, 4 ft.
Vine.....	1 ounce.....		1	-2	8	-12	8 to 12 feet.....	Drills, 2-3 ft.; hills, 4 ft.
Sweet potato.....	5 pounds.....	*75	2	-3	3	-3½	3 to 3½ feet.....	12 to 14 inches
Tomato.....	1 packet.....	35- 50	½		3	-4	2 to 3 feet.....	1½ to 3 feet
Turnip greens.....	do.....		¼- ½	2	-2½		14 to 16 inches.....	2 to 3 inches
Turnips and rutabagas.....	½ ounce.....		¼- ½	2	-2½		do.....	do.
Watermelon.....	1 ounce.....		1	-2	8	-10	8 to 10 feet.....	Drills, 2-3 ft.; hills, 8 ft.

* Slips.

POULTRY SECTION

Green Feed Rack for Poultry



To save waste of alfalfa and other green poultry feed, use a feeding rack attached about four inches above floor. The sides and back can be of wood with a hinged cover at top. Cover the front with half-inch mesh chicken wire. For dimensions and construction detail see illustration.

Handling and Marketing Eggs

Properly handled eggs for marketing mean more eggs to meet food production goals and more money in the pocket of the poultryman. The following suggestions will prove helpful.

1. To get clean eggs, keep clean litter on the floor of the laying house, provide clean nests for the hens, and keep the flock inside when yards are muddy.
2. Gather eggs often, at least twice a day in cool weather and more frequently on hot days. Gather them in baskets, never in pails or boxes, so that adequate ventilation aids them to cool rapidly.
3. Keep eggs in a cool, fairly moist place.
4. Market eggs frequently. Sell a few at a time rather than take a chance on large numbers spoiling.
5. Use cracked, dirty, and very small eggs at home. Never wash eggs unless they are to be used immediately. Clean dirty eggs by brushing lightly with a wire brush, sandpaper, steel wool, or other dry cleaning material.
6. Grade eggs for uniformity in shape, size and color.
7. Always pack so eggs will rest on the pointed end, large end up. Use only strong, standard packages and make sure they are clean.

Poultry Classifications

U. S. Certified Chicks, in addition to the approved requirements, are produced by flocks mated to R.O.P. males whose R.O.P. dams must have yearly records of 200 or more eggs. Hatching eggs must weigh 24 oz. per dozen.

U. S. Verified Chicks come from approved females and R.O.P. males from flock matings of R.O.P. males and females.

R.O.P. is an abbreviation for Record of Performance to qualify for which a female must lay at least 200 eggs averaging 24 oz. per dozen in 365 days and must be free from Standard disqualifications. A male must be pedigreed from a mating composed of R.O.P. females and one R.O.P. male. His dam must have laid at least 225 eggs in 365 days. R.O.P. records are made on home farms under state supervision.

R.O.M., Register of Merit, is a certificate awarded to the progeny of any R.O.P. individual. An R.O.M. female is one out of an R.O.P. or R.O.M. mating who qualifies one-third of her daughters with a minimum of 4 for R.O.P. ratings. An R.O.M. male with similar matings when mated to an R.O.P. or R.O.M. female must have one-third of his daughters, minimum of 20, qualify for R.O.P.

U. S. Approved Chicks come from state inspected breeding flocks under the National Poultry Improvement Plan. These flocks must be true to the type and conformation of the breed and must produce hatching eggs that weigh at least 1-11/12 oz. each.

Sexed Chicks are chicks that have been separated at hatching time into two groups, males and females, by an examination of the sex organs.

Assorted Chicks are a mixture of heavy and light chicks of all breeds.

Light Assorted is the term applied to chicks of the light breeds such as Anconas and Leghorns and may mean a mixture of these breeds or merely off-color chicks of one breed.

Heavy Assorted Chicks include such breeds as Reds, Rocks, and Wyandottes and may include off-color chicks.

Straight Run Chicks represent chicks of either light or heavy breeds and sold as they are hatched without sex separation.

Started Chicks have been held and

fed at the hatchery for a period of time after date of hatching.

Pedigreed Chicks are chicks of which the exact parents and the records of the female ancestors are known for at least two generations.

Pullorum Tested Chicks, often referred to as blood-tested or B.W.D. tested, are chicks produced from breeding stock that has been tested for bacillary white diarrhea and found to be free of the disease.

Breed is the term used to define a specifically shaped group of birds that have a recognizable type such as Plymouth Rock, Wyandotte, Leghorn, etc.

Sex-Linked Chicks are the result of a mating in which a characteristic of the female line is transmitted to the male chicks only so sexes can be determined at hatching time, that is, Barred Rock female x Red male equals barred cockerels and combination color pullet chicks.

Cross Bred Chicks result from the mating of individuals from two distinct varieties, breeds or classes.

Hybrid Chicks are commonly referred to as the result of a cross involving sex-linked characters whereby the male chicks inherit certain characteristics such as color, feather pattern, or rate of feathering from the mother, which makes possible easy separation from the pullet chicks.

Hybrid Vigor is usually present in the offspring of a mating between individuals of different breeds or classes and is probably caused by a doubling up of the growth factors of the mates so that greater growth and vigor is apparent.

Variety is a subdivision of a breed into kind of comb, plumage color, or color pattern.

Strain means family or line that has been developed in any breed or variety.

Identifying Stock for New Hands

Painting large numbers on the beams behind the stanchions and stalls in the barn makes it much easier to give directions and instructions to new hired help who are not familiar with the names of the animals. A card with the names and corresponding numbers is then hung in a convenient place so that the names can be referred to until remembered.

Fertile Eggs Keep Poorly

After the hatching season has ended, there is no longer a need for fertile eggs and it's a good idea to get rid of the roosters. Fertile eggs start to incubate at temperatures above 68 degrees. Blood rings develop in fertile eggs in from three to five days at 85 to 100 degrees temperature, quickly making them unfit for human consumption.

Milk Substitutes in Poultry Feeding

Among the products that poultrymen are turning to as substitutes for the protein in milk are soybean oilmeal, corn gluten meal and peanut meal. While these products supply protein, they do not supply the vitamins and minerals which are vitally important and which constitute much of the value of milk in poultry feeding.

Milk may be replaced if necessary in growing and laying mashers, but it is not safe to replace all of it in mash for breeders, and we do not recommend that all of the milk be replaced or omitted from growing or laying mashers unless it is absolutely necessary. It may be possible to supplement a mash that contains no dried milk with liquid skim milk or condensed milk. If these are available then their use helps conserve dried milk for human consumption.

If some other feed such as soybean oilmeal, is used to replace dried milk, a part of the vitamins lost by the change may be supplied by increasing the proportion of bright alfalfa meal. This may be increased to 10 percent of the total mixture. In addition, yeast may be used to provide a part of the vitamins, but often yeast is about as expensive as dried milk.

Another newer product than soybean oilmeal, corn gluten meal and peanut meal that may be used in place of dried milk is corn distiller's dried grains with solubles. It carries 28 to 30 percent protein and the water soluble vitamins that are present in the fermentations of grain by yeast. It has been used to replace part of the milk in breeder mashers and sometimes to replace all of the milk in chick starting and laying mashers.

In most cases dried milk for poultry rations is still available and we expect it will continue to be, but in some cases it has been difficult or impossible to get a steady supply of the dried product. For layers at the Iowa Station, the amount of milk in the mash has been cut down and the soybean oilmeal and alfalfa meal increased.

Takes Fight Out of Roosters

A piece of strong cord with an anti-slip loop at each end is all that is necessary to dampen the ardor of a quarrelsome rooster. One loop is tied around the rooster's neck, the other is left dangling. When he tries to fight, he gets his feet tangled in the dangling loop, and soon gives up fighting in disgust. The bowline knot (see page 11), or its variations, will be found satisfactory for the purpose of making the loops.

Larger Flocks Save Work

According to Purdue University Extension Bulletin 298, flocks of 100 to 200 hens require one-fourth to one-third more time per 100 hens than 500 to 600 hen flocks. Unless women and children can do a major part of the work, flocks of 100 to 110 hens might well be either doubled in size if the necessary housing is available, or reduced to whatever number is necessary to supply eggs for the house. This smaller flock could forage for itself with a minimum of care. The same number of trips to the hog pasture or poultry house will care for large herds or flocks as well as small ones and it may pay to concentrate on one or two large enterprises instead of spreading them over a number of small ones.

Suggestions for Marketing Eggs

Keep strong, healthy, vigorous stock and care for it properly.

Provide plenty of clean nests for the laying hens.

Gather eggs twice a day.

Keep the eggs in a cool, fairly dry place.

Keep out the cracked, dirty, small, and very large eggs for home use.

Never wash eggs unless they are to be used immediately by local trade.

Market eggs frequently, at least once a week and preferably twice.

Know the preferences of your market and strive to meet them.

Grade your eggs for uniformity in size, shape, and color.

Know the shipping requirements of express or railroad companies when you use their services.

Use only sound, strong standard packages and pack the eggs properly.

Remember quality is essential for best prices.

If you are selling through a satisfactory agency with which you have established a reputation for high quality, be very sure that you have secured a better outlet before you make a change.

Suggestions for Culling the Flock

Cull:

1. Cripples and hens with broken down abdomens.
2. Poor layers and old hens.
3. Sick and inactive hens.
4. All "crow-heads" with long, slim heads and beaks.
5. Large, coarse-headed hens with sunken eyes.
6. Late hatched, immature pullets, and those undersized from earlier hatches.
7. All hens that moult before August 1st.
8. All hens with solid fat abdomens.
9. The hens that insist on setting.
10. All cockerels not needed in the flock for future breeding purposes.

Keep:

1. Strong, healthy hens with short, neat heads and strong beaks.
2. Hens with long deep bodies.
3. Hens with bright eyes and active appearance.
4. Hens with dirty, dusty, worn feathers, but looking healthy.
5. Rapid and late moulters.
6. Vigorous hens with bleached beaks and shanks.
7. Hens with well spread pelvic bones.
8. Early hatched, well grown pullets.
9. Hens conforming to their breed characteristics.
10. Large, strong, active, well matured cockerels of good type and ancestry for breeding.

Brooding Precautions

Four brooding essentials to help assure a successful season are:

1. Brood chicks on ground where chickens have not ranged for several years, and keep the growing pullets on a clean range until they are five months old.

2. Disinfect the brooder house thoroughly before putting the chicks in it, and clean the house at least once a week afterwards.

3. Keep a pan of creolin or some other disinfectant at the entrance to the chick yard for disinfecting the soles of anyone's shoes before entering.

4. Scrub and disinfect the permanent laying house before putting pullets in it, and plow and reseed the range about the laying house before allowing the pullets on it.

5. As the chicks increase in size, the litter in the brooder houses will need changing more frequently. Good, clean, dry litter helps in preventing outbreaks of disease.

Plan Carefully Before Ordering Chicks

It's a wise poultryman who makes careful plans and preparations before ordering baby chicks, according to the North Dakota Agricultural college. Here are some of their recommendations:

1. Order baby chicks early and when you order, make a definite arrangement with the hatchery as to when the chicks are to be delivered.

2. Plan carefully before placing your order. Decide whether you want an egg-producing breed, a meat breed or a dual purpose breed.

3. Know exactly how many chicks you can handle with the equipment you have. Better to order 100 chicks and have them grow to profitable maturity than to buy 200 and lose half of them from overcrowding, chilling, or other results of poor planning or lack of equipment.

4. Check all equipment. Clean and disinfect the brooder house. Check and clean the brooder stove, and be sure before the chicks are ordered that you will be able to get enough fuel to carry you through the season. Baby chicks and poults are delicate creatures and they need a dependable and controlled source of heat. One bad chilling or excessive heat can cut a big hole in your poultry profits, so don't run risks.

5. If you use ready-mixed starter feeds, be sure your dealer will have a supply when you need them. An advance order is good insurance.

6. Beware of "bargain" chicks and poults, particularly when you don't know the source of the hatching stock.

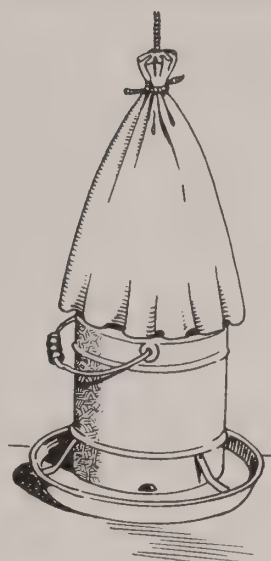
Take Care of Egg Cases

Egg cases will last much longer if they are handled carefully at all times. Keep them clean and do not use cases for other purposes such as temporary garbage containers or a kerosene can holder. Do not nail the lids in the middle, and one short nail in each end of the lid is often enough when the haul is short.

Turkeys Prefer Usual Food

Turkeys are birds of habit. They prefer grain to which they are accustomed to the point where they will go hungry rather than eat strange grain. Some growers make a mistake by giving their birds almost any kind of feed up until the final fattening period when they suddenly switch the flock to corn. Given free choice, fattening turkeys eat large amounts of whole grain in proportion to the amount of mash they consume.

"Roost Proof" Waterer



Here is a simple way to prevent hens from roosting on water fountains and making the water unfit for drinking. Simply slip a gunny sack over the fountain top, suspending the sack from a cord attached to the ceiling.

Chicken Life Raft

If you have an open water tank in the barnyard in which your chickens insist on getting drowned toss in a small board float. The chickens will save themselves by getting aboard the float and navigating to safety.

Ashes Aid Cleaning of Poultry Houses

Save the ashes from your stoves or furnace and sift them through a $\frac{3}{4}$ -inch mesh screen. Then after you have cleaned the dropping boards in the poultry house, spread a thin, even layer of the sifted ashes over them, using a broom to even them off. The boards can then be cleaned very easily, even in freezing weather, as the droppings will not freeze or mat down to the boards. The ashes will also improve the quality of the manure.

Incubation Periods

While the period of incubation may vary a day or two because of conditions affecting temperatures, the following table given by the U. S. Department of Agriculture represents an average:

	Days
Hen	21
Pheasant	22-24
Duck	28
Muscovy Duck	33-35
Turkey	28
Peafowl	28
Guinea fowl	26-28
Ostrich	42
Goose	30
Pigeon	17

Estimate Poultry Feed Requirements

Information compiled by the North Dakota Agricultural college indicates that about 24 to 25 pounds of feed are required to grow a Leghorn pullet to maturity, of which 10 to 11 pounds is mash and the balance small grains. Heavier breed pullets need 4 to 5 pounds more feed.

About 35 pounds of mash and 50 pounds of grain are needed per year by a Leghorn laying hen. Heavier hens need about 5 pounds more of both mash and grain when confined.

The College recommendations for feed conservation include the following practices:

1. Put all poultry feed in hoppers of a size adapted to the age and size of birds being fed.

2. Construct hoppers to prevent birds from pulling feed out, or soiling feed by birds getting into hoppers.

3. Don't fill hoppers too full.

4. Protect feed hoppers from wind and rain.

5. Use farm feed materials as much as possible. Feed liberally and provide needed supplements.

6. Young, tender green pasture or range will save some feed, but do not expect it to produce miracles.

7. Keep feed in hoppers at all times. Cutting down on feed supply means slow growth and fewer eggs.

Prevent Brooder House Fires

Many brooder house fires, common in nearly every community in the spring, can be prevented by following these simple safety measures:

1. Place the brooder on a low sand box which extends at least 2 feet out around the brooder. This will lessen the possibilities of fire from trash accumulations around the brooder stove.

2. Allow no rubbish to accumulate in or near a brooder or poultry house.

3. Do not smoke in or near such buildings.

4. Be certain brooders are in good condition, are properly set up, and that all connections are properly made.

5. Fuel supplies, particularly oil, should not be stored in or near a building.

6. Never pile hot ashes near a frame building.

7. Hang a lantern on a hook or wire. Don't place lanterns on the floor.

8. A smoke pipe through the roof should be at least 4 inches from any wood.

9. Be certain there is no brush or dry grass near buildings.

Laying Hens Need Much Water

If maximum egg production is to be maintained, the heavy laying poultry flock should have 6 to 7 gallons of water per 100 birds daily. One authority, W. R. Whitfield of Iowa State College, points out that water consumption is just as important as feed in winter egg production.

A flock of 100 birds can subsist on 3½ gallons of water a day, but it will lay few eggs. It is estimated that a hen must take at least 50 to 60 "drinks" before she goes to roost in the evening if she is to lay the next day.

During cold weather, special effort should be made to keep water consumption by hens at a high level. Houses which are sufficiently warm to prevent freezing are the most efficient in securing maximum production. In other houses it may be necessary to provide insulated waterers or to use heaters to prevent freezing.

Hot water placed in the waterers early in the morning and again in the evening can be used in exceptional cases where it is impossible to provide water by any other means. Be careful, though, that it is not so hot that it will be dangerous for the hens to drink.

Control Measures for Coccidiosis

1. Keep the chicks confined to the brooder house and sanitary sun porch.
2. Change the litter each day for a period of 10 days.
3. Burn the litter removed or spread it on land not used for poultry range.
4. Scrub the fountains each day and put reels on the feeders that do not have them.
5. At the end of the 10-day period scrub the brooder house with scalding lye water using 4 oz. of lye to 10 gallons of water.
6. If the chicks cannot be provided with a sanitary sun porch with a floor of deep coarse gravel, concrete, wood slats or wire cloth, the brooder house should be moved to clean range.

Iowa Agricultural Extension Service Bulletin P47.

To Find Amount of Disinfectant Required for Poultry House

To determine the number of gallons of disinfectant necessary for disinfecting a poultry house, multiply the length of the poultry house by the width, in feet, and divide the result by 20.

Temperature Chart for Poultrymen

Still air incubator, 101° to 103° F.
Forced draft incubator, 99° to 100° F.
Hover, day old chicks, 95° to 100° F.
Hover, 1 to 2 weeks old chicks, 90° F.
Hover, 2 to 3 weeks old chicks, 85° F.
Hover, 3 to 4 weeks old chicks, 80° F.
Room housing incubator, 70° F.
Fertile eggs start incubation at 69° F.
Eggs for hatching, keep between 50° and 60° F.
Eggs at farm, store, or home, keep at 40° to 55° F.
Eggs deteriorate very rapidly between 80° and 100° F.
Cold storage eggs held at 29° to 30° F.
Eggs freeze at 28° F.
Keep a reliable thermometer for your incubator, brooder, and egg storage room.

(Adapted from Bul. 9, Connecticut Department of Agriculture.)

Suggested Rations for Laying Hens

	Pounds
Ground Yellow Corn.....	46.5
Middlings	20
Ground Oats	10
Bran	5
Alfalfa Leaf Meal	5
Meat Scraps	8
Dried Milk	4

Selecting Best Layers

The following chart, reproduced from the Virginia Polytechnic Institute Extension Division News, is designed to help the poultry raiser to distinguish between profitable and unprofitable hens.

SELECTION CHART—Characteristics Identifying Layers and Non-layers

Character	Condition in a—	
	Non-layer	Layer
Comb.....	Dull, dry, shriveled, scaly	Large, bright red, smooth, glossy
Face.....	Yellow tint	Bright red
Vent.....	Shrunken, puckered, dry	Enlarged, smooth, moist
Pubic bones.....	Blunt, rigid, close together	Thin, pliable, spread apart
Abdomen.....	Contracted, hard, fleshy	Expanded, soft, pliable
Lateral processes.....	Hard to find, stiff	Prominent, pliable
Skin.....	Thick, underlaid with fat	Soft, loose

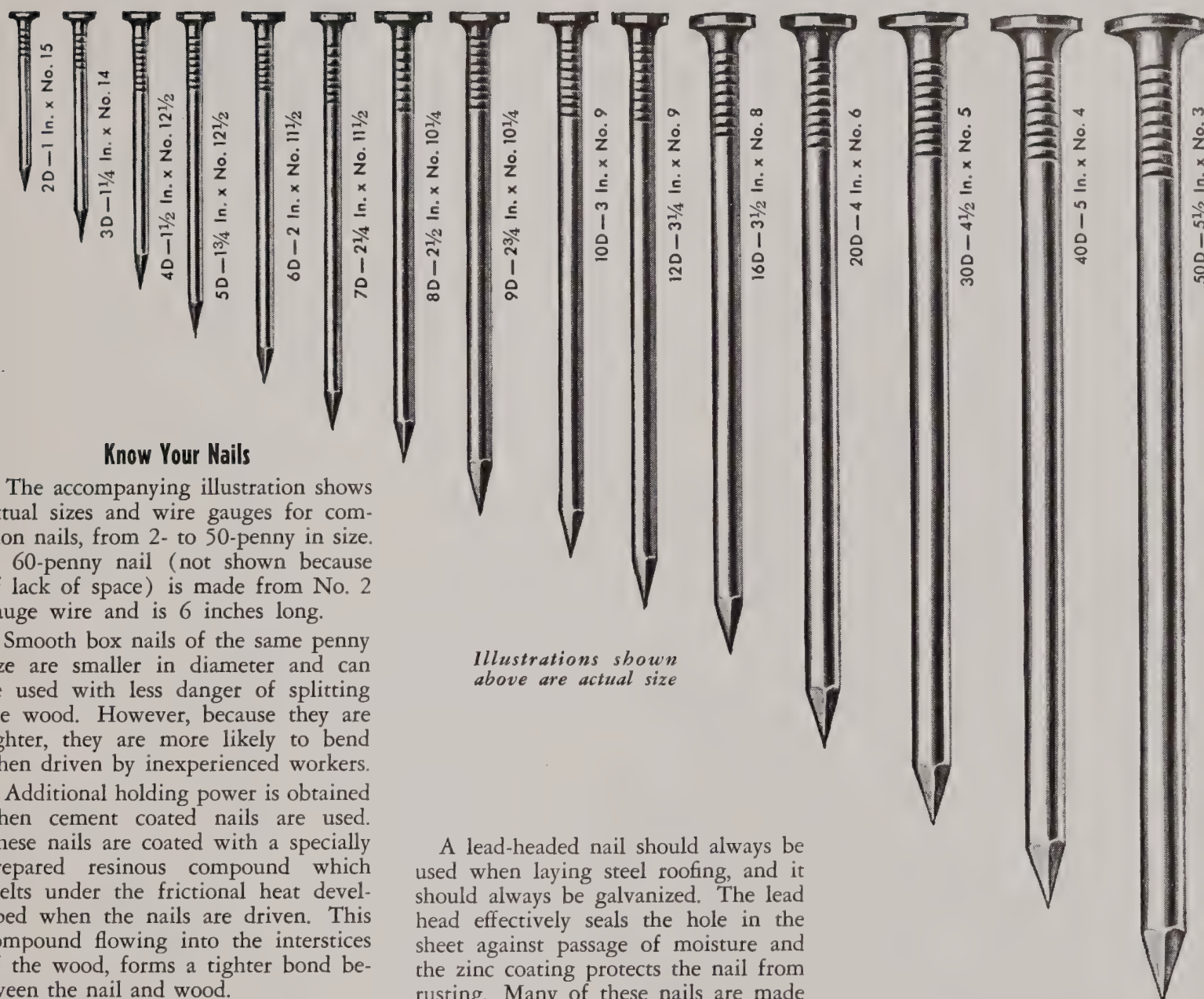
Characteristics Indicating Whether Previous Production was Continuous or Brief

Character	Condition associated with—	
	Continuous Laying	Brief Laying
Vent.....	Bluish white	Yellow tint or flesh color
Eye ring and ear lobe.....	White	Tinted with yellow
Beak.....	White	Tinted with yellow
Shanks.....	White, rather flattened	Yellow, round
Plumage.....	Worn, soiled	Not much worn
Molting.....	Late, rapid	Early, slow

Characteristics of a High-laying Strain

Time of maturity..... Laying begins at about 6 months of age in the case of Leghorns and at about 7 months in the case of Rhode Island Reds, Plymouth Rocks, and similar breeds.
Rate of production.....Average of 180 or more eggs a year.
Broodiness.....Birds are seldom broody.
Persistence of production.....Hens are laying well in August and September toward the end of the first laying year or after it is completed.

FARM BUILDING SECTION



Know Your Nails

The accompanying illustration shows actual sizes and wire gauges for common nails, from 2- to 50-penny in size. A 60-penny nail (not shown because of lack of space) is made from No. 2 gauge wire and is 6 inches long.

Smooth box nails of the same penny size are smaller in diameter and can be used with less danger of splitting the wood. However, because they are lighter, they are more likely to bend when driven by inexperienced workers.

Additional holding power is obtained when cement coated nails are used. These nails are coated with a specially prepared resinous compound which melts under the frictional heat developed when the nails are driven. This compound flowing into the interstices of the wood, forms a tighter bond between the nail and wood.

Galvanized nails should always be used when longest service and protection against rusting is desired, as in the case of laying wood shingles, composition or steel roofing, or similar uses. The zinc coating protects the steel against corrosion.

Blued nails offer no additional protection against rusting, but are clean and sterile nails provided for lathers and other workers who carry them in their mouth while at work. No other nails (especially galvanized) should be placed in the mouth.

Annealed nails are generally employed where it is desirable to clinch the point after driving to give increased holding power. They are made sufficiently soft to clinch readily, yet are stiff enough to drive without undue difficulty.

Illustrations shown above are actual size

A lead-headed nail should always be used when laying steel roofing, and it should always be galvanized. The lead head effectively seals the hole in the sheet against passage of moisture and the zinc coating protects the nail from rusting. Many of these nails are made with a screw shank, which greatly increases the holding power.

Roofing Nails

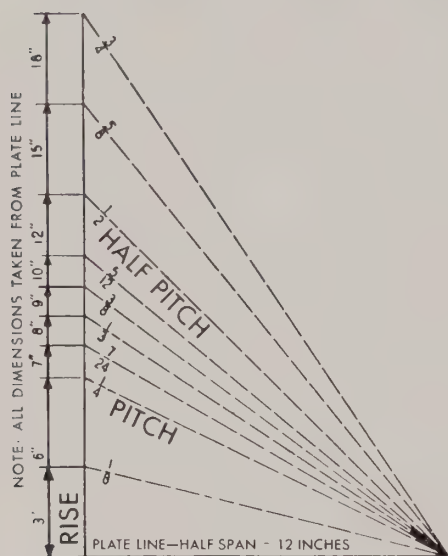
All nails for use on roofing sheets should be galvanized. The necessity of sealing nail holes in metal roofing against the passage of moisture should never be disregarded. It is important, therefore, that nails with lead heads or an equivalent feature be used. Tests have proved the superiority in holding power of the drive screw type of nail. Other things being equal, the holding power of a nail is proportional to the area of its surface in contact with wood. For this reason two-inch nailing strips are recommended to obtain best anchorage. It is generally safe to figure on about one pound of nails for each square (100 square feet) of roofing.

Light Reflection Values

Briefly stated light reflection is simply the turning back of light which strikes a wall, a ceiling, or other object—light which is neither transmitted nor absorbed. Light is absorbed by dark colored or oiled surfaces. Hence, black has a reflection value of only 2 per cent, while white flat paint reflects 89 per cent of the light striking it. Comparative reflection values of different colors are given in the following table:

White 89%	Buff 63%
Ivory 82%	Pale Green . . . 59%
Canary Yellow . . 77%	Shell Pink . . . 55%
Cream 77%	Bright Sage . . . 52%
Caen Stone . . . 76%	Silver Gray . . . 46%
Orchid 67%	Olive Tan . . . 43%
Cream Gray . . . 66%	Forest Green . . 22%
Ivory Tan 66%	Coconut Brown . 16%
Sky Blue 65%	Black 2%

To Figure Roof Pitch



The pitch of roofs having straight slopes, such as gable roofs, should be determined by dividing the rise by the span, the span being the total distance between the outer edges of the plates on the side walls. In other words, divide the rise, per 12" of horizontal distance by 24. A full pitch gable roof is one with the rise equal to the span. A half pitch gable roof is one with the rise equal to half the span. Example:—figure the pitch of a gable roof having a rise of 6" to a half span of 12". Thus 6" (the rise) divided by 24" (the span) equals 6/24, or $\frac{1}{4}$ pitch. The height of the ridge will be $\frac{1}{4}$ of the span of the building.

On a shed roof building the distance between the outer edges of the plates on the side walls will obviously be a half span for the purpose of figuring pitch.

Maintenance and Painting of Steel Roofing

All buildings require care regardless of what materials they are constructed. This applies, likewise, to sheet metal. Roofing receives more punishment than any other material on the outside of a building and for this reason it should receive periodical inspection and necessary attention.

Steel itself is a "strength metal," and, if properly applied and protected, as a roofing material it will last almost indefinitely and be an effective barrier against fire and storm.

All steel roofing, whether galvanized or not, should be painted. The galvanized coating will resist corrosion for varying lengths of time depending upon climatic conditions. In dry climates a galvanized roof might not need

painting for many years. In other climates, particularly where the air is moist or full of smoke and corrosive gases, it might be advisable to paint it after it has "weathered" for about six months. This assures better adherence of the paint.

Those who choose to wait until painting is necessary should not delay painting after the first signs of rust are visible.

A roof should be thoroughly clean before painting. All spots covered with loose rust should be brushed off with a wire brush. Loose nails should be removed and replaced with new ones, driven at an angle away from the old nail hole to assure good holding power.

Roofs should never be painted unless absolutely dry. It is a very poor practice to try to paint just after a rain or when there is dew on the roof. Furthermore, if it seems that a storm is approaching, painting should be discontinued so the paint may set.

There are a number of good types of paint on the market which are suitable for use on galvanized steel sheets. With lead paints a rust-inhibiting or primer coat should first be applied for best results. Aluminum paint, used extensively in some parts of the country, also requires a primer.

Metallic zinc paint is being used increasingly on farms and has given excellent results. Its performance has been especially good even where the galvanizing has disappeared. The commercial formula best suited for application to galvanized sheets exposed to the weather calls for 80% zinc dust and 20% zinc oxide mixed with a suitable vehicle such as linseed or soy bean oil. This type of paint is furnished ready-mixed by a number of leading paint manufacturers.

Metallic zinc and paint spreads easily, a gallon covering about 800 square feet. It has good hiding properties and forms a tough, adherent coating. This paint is most commonly used in its natural color—a battleship gray—although some producers now furnish the paint in other colors.

To Find the Amount of Paint Required For a Given Surface

It is impossible to give a rule that will apply in all cases, as the amount varies with the kind and thickness of the paint, the kind of wood or other material to which it is applied, the age of the surface, etc. The following is

an approximate rule: Divide the number of square feet of surface by 200. The result will be the number of gallons of liquid paint required to give two coats; or divide by 18 and the result will be the number of pounds of pure ground white lead required to give three coats.

Farm Building Roof Types

The more common roof shapes used on farm buildings are:

Shed Roof, also called "lean-to." Economical and sheds water well but is suited only for short spans of 10 to 20 feet as in a poultry house or garage. Wider spans require deeper rafters to give adequate strength.

Gable Roof. A simple, economical construction, widely used. Stronger than the shed roof and suitable for wider spans. Each rafter spans only half the structure and leans against its mate. Lower ends of rafters tend to spread apart and must be restrained by joists, collar beams or tie rods. Pitch is computed by dividing the rise by the span. Pitches in common use are $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$.

Broken Gable. This is a gable type roof with unequal spans and either different roof pitches or different wall heights on opposite sides of the ridge. Provision is necessary to prevent spreading as in the gable roof. Most frequently used on buildings housing poultry, hogs and machinery.

Monitor. A double gable, one above the other. Additional vertical walls provide added window space to admit more light. More difficult to construct and permits greater heat loss.

Half Monitor. Provides a straight gable on one side and monitor on the other. Monitor usually faces in direction of greatest light. Advantages and disadvantages are the same as those of the regular monitor type.

Hip Roof. A gable type roof with corners cut off at the ends of the ridge. Pitch is usually the same on all four sides. If the building is square the roof will form a pyramid. More economical than the regular gable but the capacity is decreased.

Gambrel. Similar to the gable type but with an extra break midway in the rafters. Allows for greater storage volume as in the hay loft and is more economical as shorter rafters can be used. Provides greater slope for shedding water where most needed. Each

corner is braced and a collar beam placed just below the ridge.

Gothic. Constructed with two curved rafters to form a three hinged arch. Self supporting and requires no bracing. Provides maximum storage space and has suitable ridge for a hay rack carrier. Streamlined curves make it naturally water- and wind-resistant. Can be constructed with bent rafters made of 6 1"x4" boards well nailed and bolted, or glued, or with sawed, curved rafters made of four plies of 1" material nailed together and sawed to shape. If the latter construction is used, care must be taken to stagger joints in the different plies. Still another type of arched rafter is built of two inch planks on edge bolted together to form a laminated diamond-shaped pattern which is supported at the walls by tie rods, buttresses or piers.

Round Roof. A low cost type of combined roof and side wall construction used largely for machinery sheds, airplane hangars, etc. This is a comparatively new type of building but is rapidly gaining in popularity. The framework consists of laminated bent rafters continuous from foundation to foundation. As rafters are bolted to the foundation at either side, the structure is highly wind resistant. Rafters are made of one inch lumber bent to shape in a template and rough lumber can be used for this purpose. No internal supports are required and maximum storage space is provided. This type of building is usually covered with corrugated steel sheets and, since there are no eaves, application of the sheets is simplified.

Flat Roof. This was formerly a leaky, troublesome construction but improvements in materials have made it more satisfactory. Construction is simple, strength is secured by deep rafters, trusses or reinforced concrete and waterproofing is obtained by the use of roll roofing, tar or asphalt, and gravel. Attic space is limited but heat penetration in summer can be prevented by insulation.

Keep Silos Repaired

An abundant supply of good silage is a big help in keeping up satisfactory milk production. But, the silo must be in good condition to provide the best storage. Leaky silos let in air, and this air makes silage mold, according to Stan Witzel, University of Wisconsin agricultural engineer.

The starting point is a good inside

cleaning job. Scrape off all scraps of old silage clinging to the walls, because if they're left in they act as "seed" to start spoilage.

Concrete and Masonry Silos

In concrete silos, cracks generally show up plainly if there are any. They need to be chiseled out deep enough so they can be patched.

Tile or masonry silos call for a close inspection, since cracks are most likely to be found along the mortar joints. Chipping out the cracks half an inch deep and repointing them with good mortar will make them tight again.

If the silo shows a crack from the ground-line right on up, it takes more than patching to fix it, since it's apt to be so weak that it can burst from the pressure of the silage. Here the thing to do is to reinforce it with hoops before patching.

As the final step in the repair job, it is good practice to coat the inside with cement plaster or a thick cement wash. The silo must be thoroughly cleaned first, to remove loose particles.

Wood Silos

Sometimes, all that is required to keep a wood stave silo in usable condition is to clean it and tighten the hoops.

If a wood silo is twisted and sagging, it needs to be straightened. This can be done by loosening the hoops, pulling it back into shape with a block and tackle, and then tightening the hoops again.

After straightening the silo, many farmers put on some of the new wide wooden hoops to help prevent twisting in the future. Guy wires also help to keep the silo straight.

Wood staves that are in poor condition should be replaced with new ones. If the lower ends of the staves are rotted and fit the foundation poorly, the ends can be cut off and the whole silo lowered slightly.

Tight-Fitting Silo Doors

No matter what type of silo is on the farm, it needs tight-fitting doors. If they can't be repaired easily, one way to avoid air leakage here is to put building paper inside them as each section is put in at filling time.

Prevent Insects in Stored Grain

While it is possible to kill weevils, bran beetles, and other insects which infest stored grain by fumigation, the best measure for preventing infestation

and damage by these pests is sanitation. Since most insect damage is caused by failure to clean out the bin before new grain is stored, the following preventive measures are suggested.

1. Grain bins should be cleaned out as long in advance of grain harvest as possible.

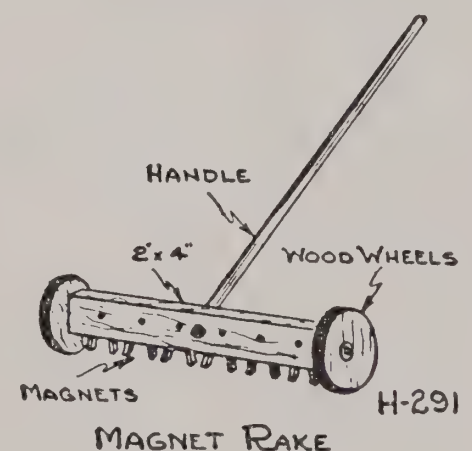
2. Old grain should be removed and the bins and floors swept and sprayed with a contact insecticide. (J. J. Davis, head of the entomology department at Purdue University, suggests a mixture of one gallon of dormant tree spray oil and three ounces of household lye in nine gallons of water.)

3. Special care should be taken to spray behind bin linings and between partitions where loose grain accumulates.

4. Sacks of feed and similar material which are stored next to or near grain bins often are heavily infested and should be disposed of, or at least removed some distance from the grain storage bins.

5. Grain should not be stored until it is in a sufficiently dry condition, because damp grain promotes mold, and mold promotes grain beetle increase. Beetles, in turn, are largely responsible for heating of grain.

Magnet Rake for Nails



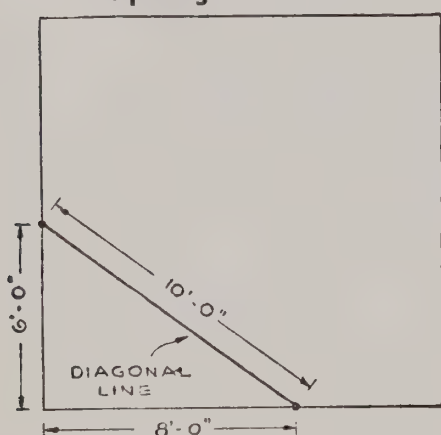
This diagram shows an Idaho 4-H project for keeping the farm driveway and barn lots free of loose nails and bits of wire and sharp tin which might damage tires and bare feet. Half a dozen horseshoe magnets from an old Ford magneto are bolted to a 2 by 4, with wood wheels at the ends and a handle. Running this over the driveway and yard every few days and dumping the collected material into a scrap box will save many a puncture and help the war effort. This is especially important after roofing or remodeling work has been done.

Laying Out the Building Foundation

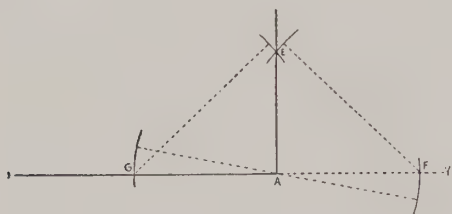
When erecting a new building, it is important that the foundation be square, of correct dimensions, and perfectly level at the top.

The following methods are suggested for laying out the foundation. Materials needed are: a steel or cloth tape 50 or 100 feet long, a dozen spikes, a ball of heavy twine and a number of smooth, well-sharpened stakes. If proper care is exercised in all operations described and measurements are carefully made and checked, these methods will assure an accurate, square foundation.

Squaring the Corners

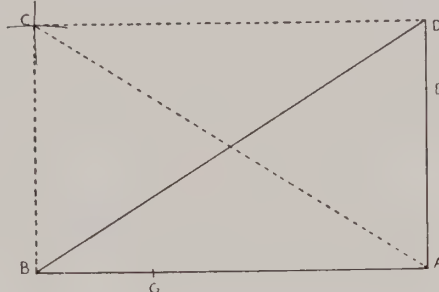


To square forms for a cement floor or foundation, start at the corner and measure eight feet along the side, and mark the spot. Then start from the same corner and make a mark six feet from the corner along the end. If it measures exactly ten feet diagonally across from one mark to the other, the structure is square.



The Compass Method. Having established line AB and corner A, extend line AB beyond point A to Y. With A as a center, and using a strong non-stretchable cord, strike an arc on the ground on the lines AB and AY. Drive a spike at each point where the arc crosses the line (G and F) and using these points as centers, and with a slightly larger radius, scratch two additional arcs in the ground. A line drawn from corner A through the point where these two arcs cross, E, will be at a right angle to line AB, producing a square corner at A. This line may be extended to any length by means of a tight line.

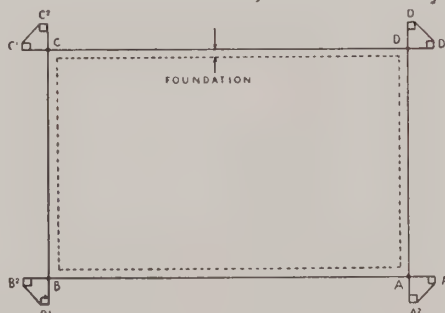
While any length of cord can be used in making the arcs, a good figure is 15 feet for the first two and 20 feet for the second two.



Squaring Other Corners. Having extended the line AE to obtain the proper length for the side of the building, drive a spike at that point (D). Now with D as the center and using a non-stretchable cord of the same length as AB, scratch an arc on the ground at a point near where it is judged the fourth corner will be. Then, with B as the center and a length of cord equal to the dimension AD scratch another arc intersecting the first. The point at which the two arcs intersect, C, locates the fourth corner, where a spike may be driven. As a means of checking results, measure diagonals BD and AC. If these are equal, all corners are square and all dimensions are correct.

COMPLETING THE LAYOUT

As spikes A, B, C, and D mark the corners of the foundation and since these will be removed when the trench or excavation is made, it is necessary to



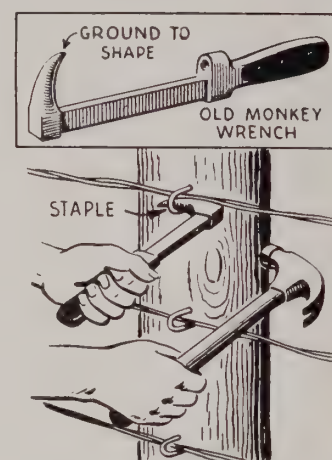
preserve these points. This can be done by driving stakes A² and D¹ about three feet beyond points A and D respectively and so located that a line stretched between them will pass directly over the spikes driven into the ground at these points. Place additional stakes at D² and C¹, C² and B¹ and B² and A¹, each located so that a line stretched between them will pass over the spikes. The points at which the lines cross mark the true corners of the building and the layout has been completed, ready for the excavation. After the excavation has been completed, it is possible to locate the corners at the bottom of the excavation by dropping a plumb bob from the points where the cords cross.

To Test a Scaffold Plank

Block plank to be tested up a foot from the ground placing the supports the same distance apart as the scaffold supports on which it is to be used. Now load the plank with 3 times the load it will be required to support in actual use, placing load as close to center as possible. At the slightest sign of weakness, discard the plank and mark it so no one else will use it as a scaffold plank.

National Safety Council Safety Instruction Card No. 15.

Staple Puller Made from Old Wrench



The illustration shows a very efficient staple puller which can be made from an old monkey wrench in a few minutes.

Merely remove the lower or movable jaw and screw of the wrench and grind the upper or fixed jaw to a point on a grindstone or emery wheel as shown. The lower illustration shows how the puller is used.

Binder Twine Holder

A temporary twine holder can be made by using a sack. Put the ball in a sack, tie the sack loosely, leaving the loose end of twine projecting. This will help prevent the twine from unwinding and becoming tangled.

Repair Link for Log Chain



You can quickly make a temporary repair of a broken log chain or join two short chains of the same size. Cut two strips of heavy strap iron a little longer than one link. Bore holes at each end of the straps large enough to take short bolts the same diameter as the material which form the links of the chain. The bolts are drawn down tight enough to grip the chain. The bolt ends should be riveted to prevent the nuts from working loose.

Barn Unit Dimensions

Consult local dairy ordinances before constructing the dairy unit. The dimensions given below will serve as a guide, however, in making preliminary plans.

FOR DAIRY CATTLE

Mangers. The mangers should be from 20 to 30 inches wide. The front curb should be 6 to 20 inches high and the rear curb 6 to 8 inches high.

Standard Dairy Stalls

Breeds	Width	LENGTH OF STALL*		
		Small	Medium	Large
Holstein.....	3'-6" to 4'-0"	4'-10"	5'- 2"	5'- 8"
Shorthorn.....	3'-6" to 4'-0"	4'- 8"	5'- 0"	5'- 6"
Brown Swiss....	3'-6" to 4'-0"	4'- 8"	5'- 0"	5'- 6"
Ayrshire.....	3'-6" to 3'-8"	4'- 6"	5'- 0"	5'- 6"
Guernsey.....	3'-4" to 3'-6"	4'- 6"	4'-10"	5'- 4"
Jersey.....	3'-4" to 3'-6"	4'- 4"	4'- 8"	5'- 0"
Heifers.....	2'-9" to 3'-2"	3'- 8"	3'-10"	4'- 2"

* Stall length from center of curb to edge of gutter.

For adjustment in stall length to meet the requirements of cows of different sizes, either adjust the stanchion forward or backward as may be required or taper the stall platform, making it a few inches wider at one end than at the other. With the latter method, shorter cows can be assigned to stalls at the short end of the platform.

Gutters. Gutters should be 16 inches wide. Next to the platforms, the depth should be 8 inches and next to the litter alley, 5 inches. A slope of one inch in 10 feet of run should be provided for drainage but the runs should not be more than 25 feet in length to avoid too great gutter depth. One drain can serve two runs of that length, or 50 feet, by having each run slope to the center.

Litter Alleys. When the cows face outward, the litter alley should be wide enough for a driveway, or 8 to 9 feet. The center of the alley should be one inch higher than the sides to provide drainage. For the face-in arrangement, the litter alleys should be 4½ to 5 feet wide.

Feed Alleys. If feed trucks are to be used, provision for their width should be made in planning the width of the alleys. They should be at least 4 feet wide, however.

Maternity Pens. Provide at least 100 square feet of floor area for each maternity pen. Maternity pens should not be less than 8 feet wide.

Calf Pens. A minimum of 16 to 20 square feet of floor space should be provided for each calf. Calves over six months of age will require 25 to 35 square feet of floor space. Space stanchions 20 to 24 inches apart.

Bull Pens. Bull pens are usually located in a corner of the barn to conserve space and to isolate the bull as much as possible. Provide the same amount of floor space as for maternity pens and arrange for a door opening directly into the exercise lot.

FOR HORSES

Box Stalls—Box stalls should be 10 feet wide and 12 feet long.

Standard Horse Stalls are 5 feet wide and 9 to 10 feet long, including 2 feet for the manger.

Feed alleys should be 3 to 4 feet wide and a space 6 feet wide should be provided for the rear alley.

FOR BEEF CATTLE

Make available 40 to 60 square feet of floor area and 30 inch manger or feed rack space for each animal not confined to a pen.

FOR SHEEP

A floor space of 12 to 16 square feet should be available for each head of sheep.

FOR HOGS

Farrowing pens should be approximately 8 feet by 8 feet in dimensions or from 50 to 70 square feet in area.

Floor Space Required for Poultry

	Sq. ft. per bird
Heavy or general purpose breeds..	4
Light breeds	3
Baby chicks	1/3

In mild climates when birds are kept in colony houses and have access to free range the space required may be reduced to 3 sq. ft. for general purpose breeds and 2½ sq. ft. for Leghorns.

Allowance for Laps on Corrugated Sheets

An approximate allowance for laps in standard corrugated steel roofing is 20 to 25 per cent, and in standard siding, 12 to 18 per cent of the area to be covered.

The usual lap is 1½ corrugations on the side and 6 inches on the end for roofing, and 1 corrugation on the side and 4 inches on end for standard siding.

The accompanying table is of standard 1¼ and 2½-inch corrugated sheets, 96 inches long, and shows approximately the square feet required to cover one square (100 sq. ft.) with various end laps.

Width Corru- gation, Inches	Formed Width, Inches	Cover- ing Width, Inches	Side Lap, Corru- gations	End Lap, Inches			
				3	4	5	6
				Square Feet Required			
1¼	26	24	1½	112	113	114	116
2½	26	24	1	112	113	114	116
2½	27½	24	1½	118	120	121	122
2½	26	21½	2	126	127	129	130

Ventilation Prevents Decay

Adequate ventilation under buildings will help protect floors and other wooden parts near the ground from decay fungi. These ventilators inserted through foundation walls are usually closed in winter but should be left open in warm weather. Fungi which cause lumber to rot grow only when the wood is highly moist. No wood should be actually in contact with the soil and for adequate ventilation there should be two openings in the foundation walls through which the moist air can move out. Four-inch drain tile, one on each side, are satisfactory for this purpose and should be screened against rodents. This of course applies only to houses or buildings with wood floors and no basement.

Safe Center Loads for Scaffold Planks

Safe Load in Pounds for Select Common Eastern Spruce, Select Common Norway Pine and Select Structural Eastern Hemlock

Span in Feet	Size of plank, in inches		
	2x8 Dressed to 1½x7½	2x10 Dressed to 1½x9½	2x12 Dressed to 1½x11½
6	202	256	309
8	151	192	232
10	121	153	186
12	101	128	155
14		110	133
16			116

Span in Feet	Size of plank, in inches		
	3x8 Dressed to 2½x7½	3x10 Dressed to 2½x9½	3x12 Dressed to 2½x11½
6	526	667	807
8	395	500	605
10	316	400	484
12	263	333	404
14	225	286	346
16	197	250	303

Above values are for planks supported at the ends, wide side of plank face up, and with loads concentrated at the center of the span.

For loads uniformly distributed on a wide surface throughout the length, the safe loads may be twice those given in the table.

Loads given are net, and do not include the weight of the plank.

If select structural Coast Region Douglas Fir, merchantable structural longleaf Southern pine, or dense structural square edge and sound Southern pine are used, above loads may be increased 45 per cent.

(From National Safety Council Safety Instruction Card No. 120)

Estimating Table for Steel Roofing Products

Length of Sheet	1½-2-2½ & 3" Corrugated 26" Wide		2½" Corrugated 27½" Wide		All Forms of V-Crimp, Republic Triple Drain, Weatherboard Siding, All 24" Wide	
	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square
5 Ft.	10.833	9.231	11.46	8.73	10.00	10.000
6 Ft.	13.000	7.692	13.75	7.27	12.00	8.333
7 Ft.	15.167	6.593	16.04	6.23	14.00	7.143
8 Ft.	17.333	5.769	18.33	5.46	16.00	6.250
9 Ft.	19.500	5.128	20.63	4.85	18.00	5.556
10 Ft.	21.667	4.615	22.92	4.36	20.00	5.000
11 Ft.	23.833	4.195	25.21	3.962	22.00	4.545
12 Ft.	26.000	3.846	27.50	3.64	24.00	4.167

To find the number of sheets in a given number of squares, multiply the number of squares (100 square feet) by the number set opposite the length of sheets required, in the column showing style of roofing or siding to be used. The result will be the number of sheets required, without allowance for end or side laps.

Recommended Concrete Mixtures*

Figures below are based on the use of average moist sand.

Application	Gallons Water per Sack of Cement	Cubic Feet per Sack of Cement		Largest Size of Gravel Inches
		Sand	Gravel	
Most farm construction such as floors, steps, basement walls, walks, yards pavements, silos, grain bins, water tanks.	5	2¼	3	1½
Concrete in thick sections and not subject to freezing. Thick footings, thick foundations, retaining walls, engine bases.	5½	2¾	4	1½
Thin reinforced concrete milk-cooling tanks, fence posts, thin floors, most uses where concrete is 2 to 4 inches thick.	5	2¼	2½	¾
Very thin concrete such as top course of 2 course floors and pavements, concrete lawn furniture, most uses where concrete is 1 to 2 inches thick.	4	1¾	2¼	¾

* These are trial mixes for average conditions. It is particularly important to use not more water per sack of cement than shown in the table. If sand is very wet, reduce amount of water 1 gallon per sack of cement. If sand is dry, increase amount of water ½ gallon per sack of cement. Change proportions of sand and gravel slightly if necessary to get the most workable mix.

(From Portland Cement Association)

Use Weights to Close Doors

Attach weights to barn and shed doors so that they will go shut by themselves, thus avoiding the necessity of stopping to set down a couple of pails or a sack of feed to close the door and then load up again.

Prevent Dangerous Falls

Cellar stairs are among the worst offenders in causing falls. If the lower step is painted white so it may be easily seen, and a hump placed in the hand rail to warn of the nearing bottom, many of these falls will be prevented.

Garden Hose Shows Level

An ordinary garden hose can be used to good advantage in finding the level for the foundation of a building or the level of a drainage pipe. Tie one end of the hose to the starting point and carry the other end to the next point. Then fill the hose with water which will give you the true level.

Thawing Frozen Pipes Inside Buildings

Bad fires are sometimes caused when open flames are employed to thaw frozen water or heating pipes inside of buildings.

If combustible materials are stored near the pipes, the materials may catch fire before it is realized that the flame is hot enough to be dangerous.

The safe way under these circumstances is to use hot water.

1. Wrap the frozen section of the pipe with cloths and pour hot water upon them until the ice gives way.
2. Harm to the floor may be avoided by catching the water in buckets or tubs, or by covering the floor with heavy rags or rugs which will absorb the water.

Never use an open flame to thaw frozen pipes inside of a building. Even though the flame may not cause a fire, its sudden local heat on metal may cause the pipe or pipe fittings to break and flood the premises with water.

National Safety Council Safety Instruction Card No. 131.

Farm Water Requirements

In planning the farm water supply, some idea of average daily water requirements is necessary. The table below gives average water requirements per unit per day.

Person (bath room)	25 gals.
Person (no bath room)	12 gals.
Cow	10 gals.
Horse	10 gals.
Hog	2 gals.
Sheep	1 gal.

As these figures are averages, a variation in the amounts of water consumed may be expected. Large cows and heavy milkers, for example, will require more water than small or dry cows. One hundred hens will drink about 4 gallons of water a day.

Keeping Washers Separated

Keep plain and lock washers on ordinary brass wire shower curtain clips, obtainable from hardware stores. These clips are inexpensive so that one can be used for each different size and type of washer. They are easily opened but hold tightly when closed, preventing spilling of the washers and mixing up of various sizes. They may be hung up on nails or stored in a box. Tags indicating the size may also be slipped onto the clips to facilitate finding the right washers.

True Hammer Face

If your hammer gives you trouble by glancing, it probably is because the face is worn round. Grind it true and flat on the grindstone, and you will find that nails will drive much easier, because the cause of glancing has been corrected.

Marking a Ladder for Easy Carrying

You know how difficult it is to carry a long ladder single-handed unless you hold it right at the balancing point. And it seems that no matter how often you pick the ladder up, you have to hunt that balancing point. Next time you have to find it, mark it by painting a line on each of the side rails.

Cleaning Oilstones and Files

If a glazed surface forms on a whetstone or oilstone, boil the stone in water. This will remove the hardened oil and most of the fine steel particles and accumulated dirt. The same treatment will often work on a file or rasp.

Grease Saw with Bacon Rind

If you have a saw that has a tendency to pinch, grease it lightly with a piece of bacon rind, and it will work much better.

Mousetrap Paper Clip

Do you find trouble keeping current account notes, receipts, delivery slips and other papers of only current importance? Take an ordinary mouse trap, remove the trigger and screw the wood base to the wall at some convenient place. Papers can be clipped under the bar as they collect. This will hold them ready for the time they are needed.

Encouraging Care of Tools

It is a good plan to paint an outline of the tools on the wall in the position they hang in order to encourage everyone who uses them to replace them properly.

REFERENCE SECTION

Weights and Measures

CUBIC MEASURE

1,728 cubic inches.....	1 cubic foot
27 cubic feet.....	1 cubic yard
128 cubic feet.....	1 cord (wood)
40 cubic feet.....	1 ton (shipping)
2,150.42 cubic inches..	1 standard bushel
213 cubic inches.....	1 standard gallon
1 cubic foot.....	about 4/5 of a bushel

SQUARE MEASURE

144 square inches.....	1 square foot
9 square feet.....	1 square yard
30 1/4 square yards.....	1 square rod
40 square rods.....	1 rood
4 roods.....	1 acre
160 square rods.....	1 acre
640 acres.....	1 square mile
43,560 square feet.....	1 acre
6,272,640 square inches.....	1 acre

DRY MEASURE

2 pints.....	1 quart
8 quarts.....	1 peck
4 pecks.....	1 bushel
36 bushels.....	1 chaldron

LIQUID MEASURE

4 gills.....	1 pint
2 pints.....	1 quart
4 quarts.....	1 gallon
31 1/2 gallons.....	1 barrel
2 barrels.....	1 hogshead

AVOIRDUPOIS WEIGHT

27 11/32 grains.....	1 dram
16 drams.....	1 ounce
16 ounces.....	1 pound
25 pounds.....	1 quarter
4 quarters.....	1 hundredweight
2,000 pounds.....	1 ton
2,240 pounds.....	1 long ton

LONG MEASURE

12 inches.....	1 foot
3 feet.....	1 yard
5 1/2 yards or 16 1/2 feet.....	1 rod
40 rods.....	1 furlong
8 furlongs or 5,280 feet...	1 statute mile
3 miles.....	1 league

SURVEYOR'S MEASURE

7.92 inches.....	1 link
25 links.....	1 rod
4 rods.....	1 chain
10 square chains or 160 sq. rods...	1 acre
640 acres.....	1 square mile or section
36 square miles.....	1 township

MARINER'S MEASURE

6 feet.....	1 fathom
120 fathoms.....	1 cable length
7 1/2 cable lengths.....	1 mile
5,280 feet.....	1 statute mile
6,080 feet.....	1 nautical mile
3 marine miles.....	1 marine league

MISCELLANEOUS

9 inches.....	1 span
12 dozen.....	1 gross
1 U. S. gallon.....	.231 cubic inches
1 British (Canadian) gallon.....	.277.274 cubic inches
1 pint of water weighs.....	1.0431 lbs.
1 gallon of water weighs.....	8.3448 lbs.
1 knot.....	1 1/6 mile
100 pounds of nails.....	1 keg
196 pounds of flour.....	1 barrel
150 pounds potatoes.....	1 barrel
280 pounds salt.....	1 barrel
1 lb. of wheat is about.....	1 pint
1 lb. of soft butter is about.....	1 pint
1 lb. of sugar is about.....	1 pint
1 foot is about.....	3/10 of a meter

Cubic Inches and Cubic Feet

Common Measuring Units

Dry Measure

1 pint	33.60	cubic inches
1 quart	67.20	cubic inches
1 peck	537.69	cubic inches
1 bushel	1.224	cubic feet
1 bushel	2,150.42	cubic inches

Liquid Measure

1 gill	7.22	cubic inches
1 pint	28.87	cubic inches
1 quart	57.75	cubic inches
1 gallon	.1337	cubic feet
1 gallon	.231	cubic inches

Miles per Hour Reduced to

Feet per Minute

1 1/2 M. P. H. =	132 F. P. M.
1 3/4 M. P. H. =	152 F. P. M.
2 M. P. H. =	176 F. P. M.
2 1/4 M. P. H. =	198 F. P. M.
2 1/2 M. P. H. =	220 F. P. M.
2 3/4 M. P. H. =	242 F. P. M.
3 M. P. H. =	264 F. P. M.

Rates of Travel

To determine feet of travel per minute, multiply miles per hour by 88.

To determine feet of travel per second, multiply miles per hour by 1.467.

To determine miles of travel per hour, multiply feet per minute by .01136.

Horsepower Equivalent

A horsepower is equivalent to raising 33,000 pounds one foot per minute, or 550 pounds one foot per second.

Circumference and Areas of Circle

Diameter in Inches	Circumference in Inches	Area Square Inches	Area Square Feet
1	3.142	.7854	.005454
2	6.283	3.1416	.021816
3	9.425	7.0686	.049081
4	12.566	12.5664	.087266
5	15.708	19.6350	.136354
6	18.850	28.2743	.196350
7	21.991	38.4845	.267254
8	25.133	50.2655	.349066
9	28.274	63.6173	.441786
10	31.416	78.5398	.545415

Properties of the Circle

To obtain the area of a circle, square the diameter and multiply by .7854 or square the radius and multiply by 3.1416.

To obtain the circumference of a circle multiply the diameter by 3.1416.

To obtain the diameter of a circle multiply the circumference by .3183.

Estimating Wall Paper Requirements

The following chart will be found useful in figuring the number of rolls of wall paper required for various sizes of rooms. The chart is based upon the use of standard single rolls of wall paper, 8 yards long and 18 inches wide. Deduct one roll of side wall paper for every two doors or windows of ordinary dimensions, or for each 50 square feet of opening.

SINGLE ROLLS OF PAPER

Size of Room	Height of Ceiling			Yds. of Border	Rolls for Ceiling
	8 Ft.	9 Ft.	10 Ft.		
4x8	6	7	8	9	2
4x10	7	8	9	11	2
4x12	8	9	10	12	2
6x10	8	9	10	12	2
6x12	9	10	11	13	3
8x12	10	11	13	15	4
8x14	11	12	14	16	4
10x14	12	14	15	18	5
10x16	13	15	16	19	6
12x16	14	16	17	20	7
12x18	15	17	19	22	8
14x18	16	18	20	23	8
14x22	18	20	22	26	10
15x16	15	17	19	23	8
15x18	16	18	20	24	9
15x20	17	20	22	25	10
15x23	19	21	23	28	11
16x18	17	19	21	25	10
16x20	18	20	22	26	10
16x22	19	21	23	28	11
16x24	20	22	25	29	12
16x26	21	23	26	31	13
17x22	19	22	24	28	12
17x25	21	23	26	31	13
17x28	22	25	28	32	15
17x32	24	27	30	35	17
17x35	26	29	32	37	18
18x22	20	22	25	29	12
18x25	21	24	27	31	14
18x28	23	26	28	33	16
20x26	23	26	28	33	17
20x28	24	27	30	34	18
20x34	27	30	33	39	21

Weights of Common Nails

Size	Length Inches	Gauge No.	Diam. of Head	Approx. No. to Lb.
2d	1	15	7 Ga.	876
3d	1 1/4	14	6 Ga.	568
4d	1 1/2	12 1/2	4 Ga.	316
5d	1 3/4	12 1/2	4 Ga.	271
6d	2	11 1/2	2 1/2 Ga.	181
7d	2 1/4	11 1/2	2 1/2 Ga.	161
8d	2 1/2	10 1/4	1 1/2 Ga.	106
9d	2 3/4	10 1/4	1 1/2 Ga.	96
10d	3	9	0 1/2 Ga.	69
12d	3 1/4	9	0 Ga.	63
16d	3 1/2	8	1 1/8-In.	49
20d	4	6	3/8-In.	31
30d	4 1/2	5	1 1/8-In.	24
40d	5	4	1 1/2-In.	18
50d	5 1/2	3	1 3/4-In.	14
60d	6	2	1 7/8-In.	11

6 Per Cent Interest Table

TIME		PRINCIPAL									
		\$1	\$2	\$3	\$4	\$5	\$10	\$20	\$50	\$100	\$1000
DAYS	1	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.01	\$.01	\$.02	\$.17
	2	.00	.00	.00	.00	.00	.00	.01	.02	.03	.34
	3	.00	.00	.00	.00	.00	.01	.01	.03	.05	.50
	4	.00	.00	.00	.00	.00	.01	.01	.03	.07	.67
	5	.00	.00	.00	.00	.00	.01	.02	.04	.08	.83
	6	.00	.00	.00	.00	.01	.01	.02	.05	.10	1.00
	7	.00	.00	.00	.00	.01	.01	.02	.06	.12	1.17
	8	.00	.00	.00	.01	.01	.01	.03	.07	.13	1.33
	9	.00	.00	.00	.01	.01	.02	.03	.08	.15	1.50
	10	.00	.00	.01	.01	.01	.02	.03	.08	.17	1.67
	15	.00	.01	.01	.01	.01	.03	.05	.13	.25	2.50
	20	.00	.01	.01	.01	.02	.03	.07	.17	.33	3.33
	25	.00	.01	.01	.02	.02	.04	.08	.21	.42	4.17
	30	.01	.01	.02	.02	.03	.05	.10	.25	.50	5.00
MONTHS	33	.01	.01	.02	.02	.03	.06	.11	.28	.55	5.50
	63	.01	.02	.03	.04	.05	.11	.21	.53	1.05	10.50
	93	.02	.03	.05	.06	.08	.16	.31	.78	1.55	15.50
	1	.01	.01	.02	.02	.03	.05	.10	.25	.50	5.00
	2	.01	.02	.03	.04	.05	.10	.20	.50	1.00	10.00
	3	.02	.03	.05	.06	.08	.15	.30	.75	1.50	15.00
	4	.02	.04	.06	.08	.10	.20	.40	1.00	2.00	20.00
	5	.03	.05	.08	.10	.13	.25	.50	1.25	2.50	25.00
	6	.03	.06	.09	.12	.15	.30	.60	1.50	3.00	30.00
	7	.04	.07	.11	.14	.18	.35	.70	1.75	3.50	35.00
	8	.04	.08	.12	.16	.20	.40	.80	2.00	4.00	40.00
	9	.05	.09	.14	.18	.23	.45	.90	2.25	4.50	45.00
	10	.05	.10	.15	.20	.25	.50	1.00	2.50	5.00	50.00
	11	.06	.11	.17	.22	.28	.55	1.10	2.75	5.50	55.00
12	.06	.12	.18	.24	.30	.60	1.20	3.00	6.00	60.00	

Compound Interest

Principal of money loaned doubles at:

2 % in 35 years and 1 day.

2½ % in 28 years and 25.6 days.

3 % in 23 years and 162.81 days.

3½ % in 20 years and 53.51 days.

4 % in 17 years and 244.06 days.

4½ % in 15 years and 271.25 days.

5 % in 14 years and 74. days.

6 % in 11 years and 325.88 days.

The interest compounded annually for any number of dollars may be found by multiplying the interest for 1.00 by the given number.

To Find Interest on any Sum for any Time

Point off two places from the right of the principal and multiply it by the number of months. One-half the result is the interest at 6 per cent. Deduct one-sixth for 5 per cent, one-third for 4 per cent; add one-sixth for 7 per cent, one-third for 8 per cent, etc.

Weight of Water

1 cubic inch03617 pounds

1 cubic foot62.5 pounds

1 cubic foot7.48052 U.S. gal.

1 U. S. gallon8.355 pounds

Easter Sunday Dates

The following table gives the dates for Ash Wednesday (the beginning of the Lenten period) and Easter Sunday in each of the years listed:

Year	Ash Wednesday	Easter Sunday
1946.....	Mar. 6	April 21
1947.....	Feb. 19	April 6
1948.....	Feb. 11	Mar. 28
1949.....	Mar. 2	April 17
1950.....	Feb. 22	April 9
1951.....	Feb. 7	Mar. 25
1952.....	Feb. 27	April 13

One Month to Same Day in Another

From	to Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
January	365	31	59	90	120	151	181	212	243	273	304	334
February	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	365	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	244
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	123	153	183
July	184	215	243	274	304	335	365	31	62	92	123	153
August	153	184	212	243	273	304	334	365	31	61	92	122
September	122	153	181	212	242	273	303	334	365	30	61	91
October	92	123	151	182	212	243	273	304	335	365	31	61
November	61	92	120	151	181	212	242	273	304	334	365	30
December	31	62	90	121	151	182	212	243	274	304	335	365

Explanation—To find the number of days from January 20th to December 20th, follow horizontal line opposite January until you reach the column headed by December, when you will find 334, representing the required number of days, and so on with the other months. During leap year, if February enters into the calculation, add one day to result.

Estimating Materials for Concrete Floors, Walks and Driveways

The following table gives the number of sacks of cement, and the cubic yards of sand and gravel or stone required for 100 square feet coverage in various thicknesses. In figuring sand and aggregate, use the following weights per cubic yard:

Sand	2430-2565	Granite	2500
Pebbles	2800	Crushed Rock	2700
Limestone	2400		

Thick- ness Inches		Cubic Yards Concrete per 100 Square Feet	1:1½:2½ Mix			1:2:3 Mix			1:2:4 Mix		
			Cement Sacks	Sand Cubic Yards	Stone Cubic Yards	Cement Sacks	Sand Cubic Yards	Stone Cubic Yards	Cement Sacks	Sand Cubic Yards	Stone Cubic Yards
3	.....	0.93	7.80	0.43	0.72	6.48	0.48	0.72	5.64	0.42	0.83
3½	.....	1.08	9.10	0.51	0.84	7.52	0.56	0.83	6.52	0.49	0.96
4	.....	1.22	10.40	0.58	0.96	8.56	0.63	0.94	7.36	0.55	1.09
4½	.....	1.39	11.70	0.65	1.08	9.68	0.72	1.07	8.40	0.62	1.23
5	.....	1.54	13.00	0.72	1.20	10.72	0.80	1.18	9.32	0.69	1.37
5½	.....	1.70	14.30	0.79	1.32	11.84	0.88	1.31	10.24	0.76	1.51
6	.....	1.85	15.60	0.87	1.44	12.88	0.96	1.42	11.16	0.83	1.64
6½	.....	2.01	16.88	0.92	1.55	14.07	1.05	1.57	12.06	0.88	1.79
7	.....	2.16	18.14	0.99	1.66	15.12	1.12	1.68	12.96	0.95	1.92
7½	.....	2.31	19.40	1.06	1.78	16.17	1.20	1.80	13.86	1.02	2.06
8	.....	2.47	20.75	1.14	1.90	17.29	1.28	1.92	14.82	1.09	2.20

Thick- ness Inches		Cubic Yards Concrete per 100 Square Feet	1:2½:4 Mix			1:2½:5 Mix			1:3:5 Mix		
			Cement Sacks	Sand Cubic Yards	Stone Cubic Yards	Cement Sacks	Sand Cubic Yards	Stone Cubic Yards	Cement Sacks	Sand Cubic Yards	Stone Cubic Yards
3	.....	0.93	5.15	0.48	0.77	4.60	0.43	0.85	4.36	0.48	0.80
3½	.....	1.08	6.00	0.55	0.90	5.36	0.50	1.00	5.01	0.56	0.93
4	.....	1.22	6.78	0.63	1.00	6.05	0.56	1.12	5.66	0.63	1.05
4½	.....	1.39	7.73	0.71	1.14	6.89	0.64	1.28	6.45	0.72	1.20
5	.....	1.54	8.56	0.79	1.27	7.64	0.71	1.42	7.15	0.80	1.32
5½	.....	1.70	9.45	0.88	1.40	8.43	0.78	1.57	7.89	0.88	1.46
6	.....	1.85	10.30	0.96	1.54	9.20	0.86	1.70	8.58	0.96	1.59
6½	.....	2.01	11.26	1.05	1.67	10.05	0.92	1.85	9.25	1.03	1.71
7	.....	2.16	12.10	1.12	1.79	10.80	0.99	1.99	9.94	1.10	1.84
7½	.....	2.31	12.94	1.20	1.92	11.55	1.06	2.13	10.63	1.18	1.96
8	.....	2.47	13.83	1.28	2.05	12.35	1.14	2.27	11.36	1.26	2.10

For given materials and conditions of handling, the strength of concrete is determined primarily by the ratio of the volume of mixing water to the volume of cement so long as the mixture is plastic and workable.

are used, so long as the mixture is plastic and workable and the aggregates are clean and made up of sound particles.

In other words, if 6 gal. of water are used for each sack of cement in a mixture, the strength at a certain age is practically fixed, regardless of what quantities of aggregate

The exact amount of water required varies according to the amount of water in the aggregate. Generally speaking, 6 gallons of water per sack of cement produces concrete suitable for this type of job, or 5 to 5½ gallons if sand is damp.

Board Feet

A board foot is the equivalent of a piece of lumber 1 inch thick, 12 inches wide, and 1 foot long, or in other words, a square foot of lumber 1 inch thick. The following table gives the most common measurements, the size in inches being shown in the first column and the length in feet in the other columns:

Size in Inches	LENGTH			
	10'	12'	14'	16'
1x 2	1-2/3	2	2-1/3	2-2/3
1x 3	2-1/2	3	3-1/2	4
1x 4	3-1/3	4	4-2/3	5-1/3
1x 6	5	6	7	8
1x 8	6-2/3	8	9-1/3	10-2/3
1x10	8-1/3	10	11-2/3	13-1/3
1x12	10	12	14	16
2x 4	6-2/3	8	9-1/3	10-2/3
2x 6	10	12	14	16
2x 8	13-1/3	16	18-2/3	21-1/3
2x10	16-2/3	20	23-1/3	26-2/3

2x12	20	24	28	32
2x14	23-1/3	28	32-2/3	37-1/3
2x16	26-2/3	32	37-1/2	42-2/3
3x 6	15	18	21	24
3x 8	20	24	28	32
3x10	25	30	35	40
3x12	30	36	42	48
3x14	35	42	49	56
3x16	40	48	56	64
4x 4	13-1/3	16	18-2/3	21-1/3
4x 6	20	24	28	32
4x 8	26-2/3	32	37-1/3	42-2/3
4x10	33-1/3	40	46-2/3	53-1/3
4x12	40	48	56	64
4x14	46-2/3	56	65-1/3	74-2/3
6x 6	30	36	42	48
6x 8	40	48	56	64
8x 8	53-1/3	64	74-2/3	85-1/3
8x10	66-2/3	80	93-1/3	106-2/3
8x12	80	96	112	128

Size in Inches	LENGTH			
	18'	20'	22'	24'
1x 2	3	3-1/3	3-2/3	4
1x 3	4-1/2	5	5-1/2	6
1x 4	6	6-2/3	7-1/3	8
1x 6	9	10	11	12

1x 8	12	13-1/3	14-2/3	16
1x10	15	16-2/3	18-1/3	20
1x12	18	20	22	24
2x 4	12	13-1/3	14-2/3	16
2x 6	18	20	22	24
2x 8	24	26-2/3	29-1/3	32
2x10	30	33-1/3	36-2/3	40
2x12	36	40	44	48
2x14	42	46-2/3	51-1/3	56
2x16	48	53-1/3	58-2/3	64
3x 6	27	30	33	36
3x 8	36	40	44	48
3x10	45	50	55	60
3x12	54	60	66	72
3x14	63	70	77	84
3x16	72	80	88	96
4x 4	24	26-2/3	29-1/3	32
4x 6	36	40	44	48
4x 8	48	53-1/3	58-2/3	64
4x10	60	66-2/3	73-1/3	80
4x12	72	80	88	96
4x14	84	93-1/3	102-2/3	112
6x 6	54	60	66	72
6x 8	72	80	88	96
8x 8	96	106-2/3	117-1/3	128
8x10	120	133-1/3	146-2/3	160
8x12	144	160	176	192

To Compute Board Feet

A board foot is the equivalent of a piece of lumber 1 inch thick, 12 inches wide and 1 foot long, or in other words, a square foot of lumber 1 inch thick.

To find the number of board feet in a piece of lumber:

1. Multiply together:

Width in inches
Thickness in inches x $\frac{\text{length}}{12}$

in feet, or

2. Multiply square feet of surface by thickness in inches.

Doubling any single dimension of a piece of lumber doubles its volume, doubling two dimensions increases its volume fourfold, and doubling three dimensions increases the volume eightfold.

To Change Board Feet to Lineal Feet

Multiply Board Feet of 1"x 2" by 6.
Multiply Board Feet of 1"x 3" by 4.
Multiply Board Feet of 1"x 4" by 3.
Multiply Board Feet of 1"x 5" by 2½.
Multiply Board Feet of 1"x 6" by 2.
Multiply Board Feet of 1"x 8" by 1½.
Multiply Board Feet of 1"x10" by 1⅓.
Multiply Board Feet of 1"x12" by 1.

Weights of Structural Materials

(Pounds per Cubic Foot)

Material	Weight
Common Brick	125
Cement	94
Coal (Soft Lump)	54
Concrete	150
Cypress	29
Douglas Fir	30
Earth (rammed)	100
Gravel	120
Hemlock	28
Lime	53
Limestone	164
Oak, red	44
Oak, white	47
Pine, yellow	36
Sand	100
Water	62.4

Common Measuring Units Per Cubic Foot**Dry Measure**

1 cubic foot.....	51.043 pints
1 cubic foot.....	25.522 quarts
1 cubic foot.....	3.190 pecks
1 cubic foot.....	.804 bushels

Liquid Measure

1 cubic foot.....	59.84 pints
1 cubic foot.....	29.92 quarts
1 cubic foot.....	7.481 gallons

Commodity Measures and Weights

Commodity	Unit ¹	Approximate net weight
		Pounds
Alfalfa seed...	Bushel.....	60
Apples, fresh..	{ Bushel.....	48
	{ Barrel.....	140
Barley.....	Bushel.....	48
Beans:		
Lima, dry...	Bushel.....	56
Other, dry..	{ Bushel.....	60
	{ Sack.....	100
Lima, unshelled..	Bushel.....	32
Snap.....	Bushel.....	30
Bluegrass seed..	Bushel.....	14-30
Buckwheat....	Bushel.....	48-52
Butter.....	Tub.....	63
Cabbage.....	1½-bu. hmp..	50
Carrots:		
Without tops	Bushel.....	50
Clover seed...	Bushel.....	60
Corn:		
Ear, husked..	Bushel.....	70
Shelled.....	Bushel.....	56
Green, sweet..	Bushel.....	35
Meal.....	Bushel.....	50
Oil.....	Gallon.....	Av. 7.5
Sirup.....	Gallon.....	11.5
Cowpeas.....	Bushel.....	60
Cream, 30% butterfat...	Gallon.....	8.43
Eggs, avg. size..	Case, 30 doz..	45
Flaxseed.....	Bushel.....	56
Flour, various..	Barrel.....	196
Grain		
sorghums...	Bushel.....	56 and 50
Hempseed.....	Bushel.....	44
Honey.....	Gallon.....	12
Hungarian millet seed...	Bushel.....	48 and 50
Kafir.....	Bushel.....	56 and 50
Linseed oil...	Gallon.....	Av. 7.5
Malt.....	Bushel.....	34
Maple sirup...	Gallon.....	11
Milk (specific grav. 1.032) ..	Gallon.....	8.6
Millet.....	Bushel.....	48-50
Molasses.....	Gallon.....	11.75
Oats.....	Bushel.....	32
	{ Sack.....	100
	{ Sack.....	50
Onions, dry...	{ Bushel, late..	57
	{ Bushel, early..	50
Onions, green, bunched....	Crate.....	50-55
Onion sets.....	Bushel.....	28-32
Orchard grass seed.....	Bushel.....	14
Pears.....	Bushel.....	50
Peas:		
Green, unshelled..	Bushel.....	30
Dry.....	Bushel.....	60
Perilla seed...	Bushel.....	37-40
Popcorn:		
On ear.....	Bushel.....	70
Shelled.....	Bushel.....	56
Potatoes.....	{ Bushel.....	60
	{ Barrel.....	165
Rapeseed.....	Bushel.....	50 and 60
Redtop seed...	Bushel.....	14-40
Rice:		
Rough.....	{ Bushel.....	45
	{ Bag.....	100
	{ Barrel.....	162
Milled.....	Pocket or bag..	100

¹ See footnote at end of table.

Commodity Measures and Weights

(Continued)

Commodity	Unit ¹	Approximate net weight
Rye.....	Bushel.....	56
Sesame seed...	Bushel.....	46
Sorgo:		
Seed.....	Bushel.....	50
Sirup.....	Gallon.....	11.4
Soybeans.....	Bushel.....	60
Soybean oil....	Gallon.....	7.5
Spelt.....	Bushel.....	40
Sudan grass seed.....	Bushel.....	40
Sugarcane sirup	Gallon.....	11.25
Sunflower seed..	Bushel.....	24 and 32
Sweet potatoes..	Bushel.....	55
Timothy seed...	Bushel.....	45
Turpentine....	Gallon.....	7.23
Velvetbeans (hulled)....	Bushel.....	60
Vetch.....	Bushel.....	60
Water, 60° F..	Gallon.....	8.33
Wheat.....	Bushel.....	60
Various commodities.	Short ton....	2,000

¹ Standard bushel used in the United States contains 2,150.42 cubic inches; the gallon, 231 cubic inches and the standard fruit and vegetable barrel, 7,056 cubic inches. Such large-sized products as apples and potatoes are sometimes sold on the basis of a heaped bushel, which would exceed somewhat the 2,150.42 cubic inches of a bushel basket level full. This also applies to such products as sweet potatoes, peaches, green beans, green peas, spinach, etc.

From U. S. Department of Agriculture

Estimating Bricks for Chimneys

To find the number of bricks in chimneys of a given size, multiply the total height by the number of bricks per foot as shown in the following table:

Inside measurement	Actual brick for each foot
Single flue, 9x9 in.	24
Single flue, 9x13 in.	28
Single flue, 9x17 in.	32
Single flue, 13x13 in.	32
Double flue, 1 flue 9x9 in., 1 flue 9x13 in.	44
Double flue, each 9x13 in.	48
Triple flue, 1 flue 13x13 in., 2 each 9x13 in.	68

The above figures are based on ½ inch mortar joints, using bricks of average size.

Determining Coal Bin Capacity

The capacity of a coal bin in tons can be determined by the following method: Multiply the length, width and height (all in feet) together, and multiply that amount by 56 for hard coal and by 50 for soft coal. Divide by 2,000 and the result will be the number of tons a coal bin will hold.

Capacity of Corn Cribs
(DRY CORN — HEIGHT, 10 FEET)

Width, Feet	LENGTH—FEET													
	½	1	12	14	16	18	20	22	24	28	32	36	48	64
6	13	27	320	373	427	480	533	587	640	747	853	960	1280	1707
6¼	13	28	333	389	444	500	556	611	667	778	889	1000	1333	1777
6½	14	29	347	404	462	520	578	636	693	809	924	1040	1387	1849
6¾	15	30	360	420	480	540	600	660	720	840	960	1080	1440	1920
7	16	31	373	436	498	560	622	684	747	871	996	1120	1493	1991
7¼	16	32	387	451	516	580	644	709	773	902	1031	1160	1547	2062
7½	17	33	400	467	533	600	667	733	800	933	1067	1200	1600	2133
7¾	17	34	413	482	551	620	689	758	827	964	1102	1240	1653	2204
8	18	36	427	498	569	640	711	782	853	996	1138	1280	1707	2276
8½	19	38	453	529	604	680	756	831	907	1058	1209	1360	1813	2418
9	20	40	480	560	640	720	800	880	960	1120	1280	1440	1920	2560
10	22	44	533	622	711	800	889	978	1067	1244	1422	1600	2133	2844

The length is found at top of table, the width in left-hand column—the height being taken at 10 ft. Thus, a crib 24 ft. long, 7½ ft. wide and 10 ft. high, will hold 800 bushels of ear corn, reckoning 2¼ cubic feet to hold a bushel. If not 10 feet high, multiply by the given height and cut off right-hand figure. If above crib were only 7 ft. high, it would hold 800 x 7, equals 560 (0.) bu., etc. The same space will hold 1½ times as much grain as ear corn. Thus, a crib that holds 800 bushels of ear corn will hold 800 x 1½ = 1440 bushels of grain.

Capacity of Circular Metal Corn Cribs

Capacity Shell Corn Bushels	Capacity Ear Corn Bushels	Diameter	Height
200	115	6'-4"	8'
325	187	8'-0"	8'
455	266	9'-6"	8'
570	327	9'-6"	10'
635	390	11'-2"	8'
785	475	11'-2"	10'
905	530	12'-0"	10'
1100	600	12'-9"	10'

Ear corn 4000 cu. in. per bushel of 70 pounds. Shell corn at 2150 cu. in. per bushel.

To Estimate Quantities of Grain and Hay

Bushels of Grain or Shelled Corn in Bin: Multiply the length by the width by the depth (all in feet) and divide by 1¼.

Bushels of Ear Corn in Crib: Multiply the length by the width by the average depth (all in feet) and multiply by 2/5. If the crib is round, multiply the distance around the crib by the diameter by the depth of the corn (all in feet) and divide by 10.

Tons of Hay in Mow: Multiply the length by the width by the height (all in feet) and divide by 400 to 500, depending on the kind of hay and how long it has been in the mow.

Tons of Hay in Stack: Multiply the overthrow (the distance from the ground on one side over the top of the stack to the ground on the other side) by the length by the width (all in feet); multiply by 3; divide by 10 and then divide by 500 to 600.

Capacity of Circular Grain Bins

Capacity Shell Corn Bushels	Diameter	Height
325	8'-0"	8'
455	9'-6"	8'
570	9'-6"	10'
635	11'-2"	8'
725	12'-0"	8'
950	13'-7"	8'
1200	16'-0"	8'
1500	16'-0"	10'

To Find Number of Bushels of Grain or Shelled Corn in a Bin or Wagon Box

Multiply the number of cubic feet (length x width x depth) by .8 to determine the number of bushels in a rectangular bin or box.

CAPACITY OF BOXES

- A box 24 x 24 x 14.7 inches will hold a barrel of 31½ gallons.
- A box 15 x 14 x 11 inches will hold 10 gallons.
- A box 8¼ x 7 x 4 inches will hold a gallon.
- A box 4 x 4 x 3.6 inches will hold a quart.
- A box 24 x 28 x 16 inches will hold five bushels.
- A box 16 x 12 x 11.2 inches will hold a bushel.
- A box 12 x 11.2 x 8 inches will hold a half-bushel.
- A box 7 x 6.4 x 12 inches will hold a peck.
- A box 8.4 x 8 x 4 inches will hold a peck, or four dry quarts.
- A box 6 x 5.6 x 4 inches deep will hold a half-gallon.

Storage Space Required for Farm Machinery

Type of Machine	Space Required Feet
5-foot Mower	6x8
6-foot Mower	7x8
12-ft. Sulky Rake	6x12
Sweep Rake	10x12
Hay Loader	9x10½
14-in. Walking Plow	2x7
16-in. Sulky Plow	3x9
Gang Plow (2 14-in.)	5x9
Tractor Plow (2 14-in.)	7½x12
2 Section Spike Tooth Harrow....	3x5
7-ft. Single Disc	8x4
7-ft. Tandem Disc	8x8
Rollers	8x3
Corn Planter	6x5
1-row Corn Cultivator	6x8
2-row Corn Cultivator	7½x7
2-row Rotary Hoe	8x 3
Corn Binder	9x 8
Silage Cutter	7x12
Endgate Seeder	6x12
10-hole Grain Drill.....	5x12
6-ft. Grain Binder	9x13
7-ft. Grain Binder	9x14
8-ft. Grain Binder	10x16
Wagon	7x14
Manure Spreader	8x14
Lime Spreader	3x 4
6-buhr Feed Grinder	3x 3
Gas Engine	3x 3
Tractor	7x12
Automobile	7x14
5-ft Combine	10x12
10-ft. Combine	12x15
12-ft. Combine	15x15

To Determine Capacity of Field Machines

The approximate capacity in acres per ten-hour day, of a field machine may be obtained by multiplying its effective width, in feet, by the average speed, in miles per hour, at which it is operated. To determine the average capacity per hour divide the figure thus obtained by ten.

Capacity of Silos

Depth of silage after settling 2 days (Feet)	Inside diameter of silo in feet					
	10	12	14	16	18	20
2	2	2	3	4	5	6
4	3	5	7	9	11	13
6	5	8	11	14	17	21
8	8	11	15	20	25	31
10	10	15	20	26	33	41
12	13	19	25	33	42	52
14	16	23	31	41	52	64
15	18	25	34	45	57	70
16	19	28	38	49	62	77
17	21	30	41	53	67	83
18	23	32	44	58	73	90
19	24	35	48	62	79	97
20	26	38	51	67	85	105
21	28	40	55	72	91	112
22	30	43	59	77	97	120
23	32	46	63	82	103	128
24	34	49	66	87	110	135
25	36	52	70	92	116	143
26	38	55	74	97	123	152
27	40	58	79	103	130	160
28	42	61	83	108	137	169
29	44	64	87	114	144	178
30	47	67	91	119	151	187
31	49	70	96	125	158	195
32	51	74	100	131	166	205
33	53	77	105	138	173	214
34	56	80	109	143	181	224
35	58	84	114	149	188	232
36	61	87	118	155	196	242
37	63	90	123	161	204	252
38	66	94	128	167	212	262
39	68	97	133	174	221	272
40	70	101	138	180	229	280

Estimating the Amount of Silage**Remaining in Silo**

What is left in a silo after part has been used can be estimated as follows:

Find original amount of silage put in silo by referring to table. Find amount of silage that has been used by same method, using as depth the difference between present depth and depth two days after filling. Subtract amount used from original amount. The difference is approximate amount of silage remaining in silo.

Example: A silo 16' in diameter and 32' high was filled so that after settling two days there was 26' of silage. At time inventory was taken there was 12' of silage left. From the table it is seen that 26' of silage in a 16' silo = 97 tons. Since 12' of silage was left, 14' had been fed, and 14' of silage in a 16' silo = 41 tons. Therefore, the bottom 12' of silage in this silo would contain about 56 tons of silage, since 97 tons minus 41 tons = 56 tons.

Cornell University

Tank Capacity in Gallons

To determine the capacity of a tank in gallons, multiply the capacity in cubic feet by $7\frac{1}{2}$. One cubic foot of water weighs $62\frac{1}{2}$ pounds.

Daily Feeding From Silo

(Basis of 40 pounds of silage per cubic foot)

WINTER FEEDING TO A DEPTH OF TWO INCHES DAILY

Inside diameter of silo (feet)	Numbers of animals that may be fed, allowing—			
	40 lbs. per head	30 lbs. per head	20 lbs. per head	15 lbs. per head
10	13	17	26	35
11	16	21	31	42
12	19	25	37	50
13	22	29	44	59
14	25	34	51	68
15	29	39	59	78
16	33	44	67	89
17	38	50	75	101
18	42	56	85	113
20	52	70	104	139

SUMMER FEEDING TO A DEPTH OF THREE INCHES DAILY

10	19	26	39	52
11	23	31	47	63
12	28	37	56	75
13	33	44	66	88
14	38	51	77	102
15	44	59	88	118
16	50	67	100	134

Silo Information

Dimensions	Capacity in Tons	Acres to fill—15 Tons to Acre	Cows it will keep 5 months, 40 lbs. feed per day
10 x 20	28	3	8
12 x 20	40	3	11
12 x 24	49	$3\frac{2}{5}$	13
12 x 28	60	4	15
14 x 22	61	$4\frac{1}{2}$	17
14 x 24	67	$4\frac{2}{3}$	19
14 x 28	83	$5\frac{2}{3}$	22
14 x 30	93	6	23
16 x 24	87	$6\frac{2}{5}$	24
16 x 26	97	7	26
16 x 30	119	8	30
18 x 30	151	$10\frac{1}{5}$	37
18 x 36	189	$12\frac{1}{3}$	45

Contents of Fields and Lots

10 rods x 16	rods = 1 acre
8 rods x 20	rods = 1 acre
5 rods x 32	rods = 1 acre
4 rods x 40	rods = 1 acre
5 yds. x 968	yds. = 1 acre
10 yds. x 484	yds. = 1 acre
20 yds. x 242	yds. = 1 acre
40 yds. x 121	yds. = 1 acre
70 yds. x $69\frac{1}{7}$	yds. = 1 acre
80 yds. x $60\frac{1}{2}$	yds. = 1 acre
220 feet x 198	feet = 1 acre
440 feet x 99	feet = 1 acre
240 feet x $181\frac{1}{2}$	feet = 1 acre
120 feet x 363	feet = 1 acre
110 feet x 396	feet = 1 acre
60 feet x 726	feet = 1 acre
200 feet x $108\frac{9}{10}$	feet = $\frac{1}{2}$ acre
100 feet x $145\frac{2}{10}$	feet = $\frac{1}{3}$ acre
100 feet x $108\frac{9}{10}$	feet = $\frac{1}{4}$ acre

U. S. Government Land Measure

A township—36 sections, each a mile square.

A section—640 acres.

A quarter section—half a mile square, 160 acres.

An eighth section, half a mile long, north and south, and a quarter of a mile wide—80 acres.

A sixteenth section, a quarter of a mile square—40 acres.

The sections are all numbered 1 to 36, commencing at the northeast corner.

The sections are divided into quarters, which are named by the cardinal points. The quarters are divided in the same way. The description of a forty-acre lot would read: the south half of the west half of the southwest quarter of section 1 in township 24, north of range 7 west, or, as the case might be, and sometimes will fall short and sometimes overrun the number of acres it is supposed to contain.

NOTE—In most of the Western states, where all of the land was laid out by the Government, all titles, except in city lots, are passed by description, as under the Government survey, and there a square of 6 miles, or 36 square miles, is one township.

To Find Number of Acres in a Field

To find the number of acres in a body of land, multiply the length by the width (in rods) and divide the product by 160. When the opposite sides are unequal, add them, and take half the sum for the mean length or width.

Globular Measure

To find the surface of a globe, multiply the square of the diameter by 3.1416.

To find the volume of a globe, multiply the cube of the diameter by .5236.

To Find Height of Tree or Building

Set up a stick and measure its shadow. Measure length of shadow of tree. Length of shadow of tree, times height of stick divided by length of shadow of stick equals height of tree.

To Find Contents of a Cordwood Pile

To find the contents of a pile of cordwood, multiply the length, width and height together and divide the product by 128. This will give you the number of cords.

Capacities of Cylindrical Tanks

Tank Diam. In.	Two Bumped Heads Gal.	2 in. of Length Gal.	1 Foot of Length Gal.
12	0.80	0.81	4.9
14	1.20	1.10	6.6
16	2.02	1.50	9.0
18	2.65	1.83	11.0
20	3.17	2.25	13.5
22	4.96	2.73	16.4
24	6.73	3.25	19.5
30	18.18	5.08	30.5
36	23.26	7.28	43.7
42	34.00	10.00	60.0
48	51.61	13.00	78.0
54	74.50	16.16	97.0
60	105.00	20.50	123.0
66	133.50	24.33	148.0
72	175.0	29.33	176.0
78	227.0	34.16	205.0
84	285.0	40.00	240.0
96	415.0	50.83	305.0
108	600.0	65.67	394.0
120	815.0	81.67	490.0
132	1073.0	98.33	590.0
144	1400.0	100.00	700.0

To Find Capacity of a Cylindrical Tank in Gallons

To find the capacity of cylindrical tanks, square the diameter in inches, multiply by the height in inches, and this product by the decimal .34. Point off four decimals and you have the capacity in gallons.

Capacity of Cisterns in Barrels

Each Foot in Depth of a Circular Cistern

5 ft. in diam. holds	4.66 bbls.
6 ft. in diam. holds	6.71 bbls.
7 ft. in diam. holds	9.13 bbls.
8 ft. in diam. holds	11.93 bbls.
9 ft. in diam. holds	15.10 bbls.
10 ft. in diam. holds	18.65 bbls.

Each Foot in Depth of a Square Cistern

5 ft. x 5 ft. holds	5.92 bbls.
6 ft. x 6 ft. holds	8.54 bbls.
7 ft. x 7 ft. holds	11.63 bbls.
8 ft. x 8 ft. holds	15.19 bbls.
9 ft. x 9 ft. holds	19.39 bbls.
10 ft. x 10 ft. holds	23.74 bbls.

To Find the Capacity of a Square Tank in Gallons

Rule—Multiply the area of the bottom by the height in order to secure the cubic feet. Multiply the cubic feet by $7\frac{1}{2}$ (exact 7.48) and the result will be the number of gallons. For the contents in barrels, multiply the cubic feet by .2375.

Relation of Diameter to Capacity of Pipe

Doubling the diameter of a pipe or cylindrical vessel increases its capacity four times.

Calculating Number of Gallons in a Partially Filled Horizontal Cylindrical Tank

H=depth (in hundredths of the diameter) of the liquid.

P=portion of the total tank capacity represented by the liquid.

"H"	"P"	"H"	"P"	"H"	"P"
0.01	0.002	0.35	0.312	0.68	0.725
0.02	0.005	0.36	0.323	0.69	0.738
0.03	0.008	0.37	0.336	0.70	0.748
0.04	0.014	0.38	0.348	0.71	0.760
0.05	0.018	0.39	0.361	0.72	0.772
0.06	0.021	0.40	0.373	0.73	0.783
0.07	0.030	0.41	0.385	0.74	0.794
0.08	0.037	0.42	0.398	0.75	0.805
0.09	0.044	0.43	0.409	0.76	0.816
0.10	0.052	0.44	0.422	0.77	0.827
0.11	0.060	0.45	0.436	0.78	0.837
0.12	0.068	0.46	0.448	0.79	0.848
0.13	0.076	0.47	0.460	0.80	0.858
0.14	0.086	0.48	0.472	0.81	0.868
0.15	0.093	0.49	0.486	0.82	0.878
0.16	0.103	0.50	0.500	0.83	0.887
0.17	0.113	0.51	0.514	0.84	0.897
0.18	0.122	0.52	0.528	0.85	0.907
0.19	0.132	0.53	0.540	0.86	0.914
0.20	0.142	0.54	0.552	0.87	0.924
0.21	0.152	0.55	0.564	0.88	0.932
0.22	0.163	0.56	0.578	0.89	0.940
0.23	0.173	0.57	0.591	0.90	0.948
0.24	0.184	0.58	0.602	0.91	0.956
0.25	0.195	0.59	0.615	0.92	0.963
0.26	0.206	0.60	0.627	0.93	0.970
0.27	0.217	0.61	0.639	0.94	0.979
0.28	0.228	0.62	0.652	0.95	0.982
0.29	0.240	0.63	0.664	0.96	0.986
0.30	0.252	0.64	0.677	0.97	0.992
0.31	0.262	0.65	0.688	0.98	0.995
0.32	0.275	0.66	0.701	0.99	0.998
0.33	0.287	0.67	0.711	1.00	1.000
0.34	0.299				

Example: Water is 24 inches deep in a horizontal tank 30 inches in diameter and 4 feet long, having a capacity of 122 gallons.

$$H = \frac{\text{depth of liquid}}{\text{diameter}} = \frac{24}{30} = .80$$

For .80, P = 0.858

Multiplying 122 gallons by .858 gives 104.676 gallons—the amount of water in the tank when it is filled to a depth of 24 inches.

Bushels Per Ton of Various Grains

Grain	Weight per bushel (lbs.)	Bushels in one ton
Barley	48	41.67
Beans	60	33.33
Peas	60	33.33
Wheat	60	33.33
Corn	56	35.71
Flaxseed	56	35.71
Wrinkled Peas ..	56	35.71
Rye	56	35.71
Buckwheat	50	40
Millet Seed	50	40
Oats	32	62.5

Daily Capacity of Farm Machines

The amount of work accomplished by an individual machine depends upon its width, speed of travel, and period of operation. The following table gives some values for the more common machines in operation and the chart provides a means of calculating approximate acreages covered during a ten-hour day.

Implement	Size	Acres per 10-hr. day	Rate of Travel M.P.H.
Grain Machines			
Binder	8 ft.	28	3
Binder (tractor)	10 ft.	38	3
Header	12 ft.	43	3
Harvester-thresher	10 ft.	36	3
(with aux. engine)			
Harvester-thresher	12 ft.	43	3
Windrow-harvester	12 ft.	43	3
Haying Machines			
Mower	7 ft.	33	4
Side rake & tedder	87 in.	34	4
Corn Machines 42 in. rows			
Planter	2 row	20	3
Planter	4 row	46	3
Lister	2 row	20	3
Cultivator	2 row	33	4
Cultivator	4 row	65	4
Corn binder	1 row	9	3
Corn picker	1 row	8	2½
Corn picker	2 row	15	2½
Seeding Machines			
Grain drill	10 ft.	36	3
Grain drill	14 ft.	50	3
Plow press drill	5 ft.	16	3
Tillage Implements			
Tractor plow	2-14"	8	3
Tractor plow	3-14"	12	3
Tractor plow	4-14"	16	3
Rod weeder	12 ft.	40	3
Disk harrow	10 ft. tandem	33	3
Peg tooth harrow	20 ft. (4sec.)	70	3
Spring tooth harrow	11 ft. (4sec.)	40	3
Field cultivator	12 ft.	40	3
Rotary hoe	7 ft.	25	3
One-way disk plow	8 ft.	29	3
One-way disk plow	6 ft.	21	3

Acreage per Mile of Various Widths

Width	Acres per Mile	Width	Acres per Mile
1 foot	0.121	15 feet	1.815
5 feet	0.605	16 feet	1.936
8 feet	0.968	18 feet	2.178
10 feet	1.21	20 feet	2.42
12 feet	1.452	24 feet	2.904
14 feet	1.694	25 feet	3.025

Acre Yields Required to Equal the Weight of 50 Bushels of Corn (2800 lb.)

Barley	58.33 bushels
Beans, peas or wheat	46.67 bushels
Flaxseed, wrinkled pease, rye	50 bushels
Buckwheat, millet seed ..	56 bushels
Oats	87.5 bushels

Plowing Accomplished With Tractor in 10-Hour Day, at Various Speeds

ACRES PLOWED

Speed Miles Per Hr.	Two 12" Plows	Two 14" Plows	Two 16" Plows
1 7/8	4.52	5.28	6.04
2	4.84	5.64	6.46
2 1/4	5.45	6.35	7.27
2 1/2	6.05	7.05	8.07

Miles Traveled in Plowing an Acre

Width of Furrow, Inches	Miles
10	9-9/10
11	9
12	8-1/4
13	7-1/2
14	7
15	6-1/2
16	6-1/6

Acres Planted in Traveling One Mile 3'-6" Rows

1-Row Planter	.42 acres
2-Row Planter	.84 acres
3-Row Planter	1.26 acres

There are 10,667 stalks in an acre planted in 3'-6" rows, three stalks to the hill, hills 3'-6" apart, or drilled one stalk every 14 inches.

There are 3,556 hills in an acre planted in 3'-6" rows, hills 3'-6" apart.

Miles Traveled in Planting an Acre 3'-6" Rows

1-Row Planter	2.34 miles
2-Row Planter	1.17 miles
3-Row Planter	.78 miles

To Determine Water Pressure

To find the pressure in pounds per square inch, of a column of water, multiply the height of the column, in feet, by .434.

Recommended Air Pressures for Tires Used on Farm Tractors

FRONT TIRES—ALL SIZES

1. 4-Ply Tires	28 lbs.
2. 6-Ply Tires	36 lbs.

REAR TIRES—ALL SIZES

3. Minimum Inflation Pressure 12 lbs.
4. When plowing, increase pressure in tire on furrow wheel by 4 lbs.
5. When special heavy wheels are used, or heavy implements such as corn pickers, bedders, etc., are carried on the tractor, inflation pressure must be increased. See Tire & Rim Association schedule or contact the tractor dealer or manufacturer.

Table of Live and Dressed Weights for Poultry, Hogs and Cattle

HOGS (chilled carcass)

	In Lbs.	Per-Cent
Prime heavy hogs	350-400	82-84
Heavy butchers	280-350	80-82
Medium butchers	220-280	78-80
Light butchers	180-220	77-79
Heavy packing	300-500	81-83
Medium packing	250-300	79-80
Light packing	200-280	77-78
Bacon hogs	160-220	76-77
Light mixed	150-220	75-76
Extra light	125-150	74-75
Shipper hogs	100-200	72-76

SHEEP

Wide range	40-65
Average lambs	48-52

CATTLE

	Per-Cent
Thin cattle (dairy cows)	40-50
Barely warmed steers	50-55
Good conditioned steers	55-60
Prime cattle—long fed steers	60-up
Average for cattle	55

Example—a steer in good condition that weighs 1600 pounds, will dress out at 880 to 960 pounds.

CHICKENS

	Dressing Per-cent	Trussing Per-cent
Cocks	92	76
Cockerels	89	74
Hens	92	76
Pullets	92	74

Truck Tire Capacities and Recommended Air Pressures HIGH PRESSURE TIRES

Tire Size	Load Capacity Per Tire	Rim Size	No. of Piles	Inflation Pressure	Diameter
30 x 5	1700	5"	8	50	32.9
32 x 6	1950	5"	8	65	33.9
32 x 6	2250	6"	10	70	35.1
34 x 7	2700	7"	10	75	36.5

BALLOON TIRES

Tire Size	Load Capacity Per Tire	Rim Size	No. of Piles	Inflation Pressure	Diameter
6.00/16	915	4.50	4	28	28.4
6.50/16	1050	4.50	4	28	29.1
7.00/16	1145	4.50	4	26	30.3
6.00/17	1250	5	6	50	29.9
6.50/17	1500	5	6	50	31.1
7.00/17	1725	6	8	55	32.2
7.50/17	2000	6	8	55	33.5
7.00/18	1800	6	8	55	33.3
7.50/18	2025	7	8	55	34.6
6.00/20	1400	5	6	50	32.9
6.50/20	1700	5	6	50	34.1
7.00/20	1950	6	8	55	35.2
7.50/20	2250	7	8	55	36.5
8.25/20	2750	7	10	60	37.9

Weights of Farm Products

(Pounds per Cubic Foot)

The table below is given for reference in determining safe quantities of various farm products which may be stored in a structure.

Commodity	Weight
Alfalfa Seed	48
Apples	40
Barley	40
Clover Seed	48
Cornmeal	40
Cottonseed	27
Baled Hay	15
Loose Hay	4
Ice	57
Oats	27
Potatoes	48
Shelled Corn	47

Motor Sizes and Types

	Motor sizes		Motor type—See above
	Horse-power	Most used	
Cream separator	1/6 to 1/4	1/6	3 or 5
Washing machine	1/6 to 1/4	1/4	1
Fanning mill	1/4 to 1/2	1/4	4
Fruit and vegetable graders	1/4 to 1/2	1/4	4
Sausage grinder	1/4 to 1/2	1/4	4
Milking machine	1/4 to 1	1/3 to 1/2	4
Corn sheller (1 hole)	1/4 to 1/3	1/4	4
Small concrete mixer	1/4 to 1/2	1/2	4
Emery wheel	1/4 to 3/4	1/4	4
Feed grinder	1 to 10	5	4
Grain elevator	2 to 5	3	4
Ensilage cutter	5 to 10	7-1/2	4
Hay hoist	3 to 10	5	4
Feed mixer	3 to 7-1/2	5	4
Wood saw	5 to 7-1/2	5	4
Churn	1/6 to 1/4	1/4	4
Pump jack	1/4 to 1/2	1/3	4
Drill press	1/8 to 1/2	1/4	4

From Bulletin P13 (New Series) Iowa State College.

Approximate Capacity of Cylindrical Silos, for Well-Matured Corn Silage, in Tons

Depth of Silo, Ft.	INSIDE DIAMETER OF SILO, FEET											
	10	12	14	15	16	18	20	21	22	23	24	24
20	26	38	51	59	67	85	105	115	127	138	151	151
21	28	40	55	63	72	91	112	123	135	148	161	161
22	30	43	59	67	77	97	120	132	145	158	172	172
23	32	46	62	72	82	103	128	141	154	169	184	184
24	34	49	66	76	87	110	135	149	164	179	195	195
25	36	52	70	81	90	116	143	158	174	190	206	206
26	38	55	74	85	97	123	152	168	184	201	219	219
27	40	58	78	90	103	130	160	177	194	212	231	231
28	42	61	83	95	108	137	169	186	204	223	243	243
29	45	64	88	100	114	144	178	196	215	235	265	265
30	47	68	93	105	119	151	187	206	226	247	269	269
31	49	70	96	110	125	158	195	215	236	258	282	282
32	51	73	101	115	131	166	205	226	258	271	295	295

Dried Fruit and Vegetable Yields

	Fresh Weight	Dried Yield
Apples	12 lb.	1 1/4 lb. (3 pt.)
Beans, lima	7 lb.	1 1/4 lb. (2 pt.)
Beans, Snap	6 lb.	1 1/2 lb. (2 1/2 pt.)
Beets	15 lb.	1 1/2 lb. (3 to 5 pt.)
Broccoli	12 lb.	1 1/2 lb. (12 to 15 pt.)
Carrots	15 lb.	1 1/4 lb. (2 to 4 pt.)
Celery	12 lb.	3/4 lb. (3 1/2 to 4 pt.)
Corn	18 lb.	2 1/2 lb. (4 to 4 1/2 pt.)
Greens	3 lb.	1/4 lb. (5 1/2 pt.)
Onions	12 lb.	1 1/2 lb. (11 1/2 pt. sliced) 4 1/2 pt. shredded)
Peaches	12 lb.	1 1/2 lb. (2 to 3 pt.)
Pears	14 lb.	1 1/2 lb. (3 pt.)
Peas	8 lb.	3/4 lb. (1 pt.)
Pumpkin	11 lb.	3/4 lb. (3 1/2 pt.)
Squash	10 lb.	3/4 lb. (5 pt.)

Table prepared by Colorado Extension Service.

Attach Reference Clippings to this Page

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The Republic Dealer Is A Solid Citizen . .

The man who handles Republic products for the farm in your community is a solid, substantial citizen. He lends his full weight to every worth while community project. He has a personal interest in the welfare and prosperity of every other citizen in his community.

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REPUBLIC STEEL CORPORATION

(WIRE DIVISION)

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